

HANGAR 1: PHASE II REHABILITATION SECTION 106 TECHNICAL REPORT

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1.0 INTRODUCTION

1.1 PURPOSE

Planetary Ventures, LLC (PV) proposes the Hangar 1 Rehabilitation Project: Phase II (Seismic Strengthening, Recladding, and Interior Improvements) (the “Project” or “Undertaking”) at ARC, Moffett Field, Santa Clara County, California, and is requesting approval from the National Aeronautics and Space Administration (NASA) Ames Research Center (ARC). PV entered into a lease with NASA ARC for the Moffett Federal Airfield (MFA) premises, including use of Hangar 1 for research and development, including testing and light assembly uses related to space, aviation, rover/robotics and other emerging technologies, and any other uses permitted under applicable law. Note that this is the second in two distinct phases of the Undertaking. Phase I addressed the abatement and recoating project (which was studied separately in a prior report); Phase II addresses the re-clad, re-use, and structural strengthening of Hangar 1.

As the lead federal agency, NASA ARC is responsible for compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 United States Code 30101 et seq.), which requires federal agencies to consider the effects of their activities and programs on historic properties, and its implementing regulations in 36 Code of Federal Regulations (CFR) Part 800. The purpose of this report is to provide necessary information for compliance with Section 106, including a description of the Undertaking and the Area of Potential Effects (APE), the methodology used to identify historic properties within the APE, a description of the affected historic properties, and an assessment of potential effects resulting from the Undertaking.

NASA has begun its review process under the National Environmental Policy Act (NEPA). A Draft NEPA Environmental Checklist was prepared on December 9, 2019 and the Planning Clearance Application was submitted to the NASA Ames Planning Office on December 10, 2019. Permit review clearance is anticipated by summer 2020. The Phase I (Abatement) Technical Report was submitted in April 2020.

The Phase I and Phase II Projects are subject to National Park Service (NPS) review and approval as part of the Federal Rehabilitation Tax Credit Certification Process. The Tax Credit Part 1 application was approved by the NPS on February 14, 2020. The Tax Credit Part 2 submittal is anticipated in May 2020.

1.2 PROJECT LOCATION

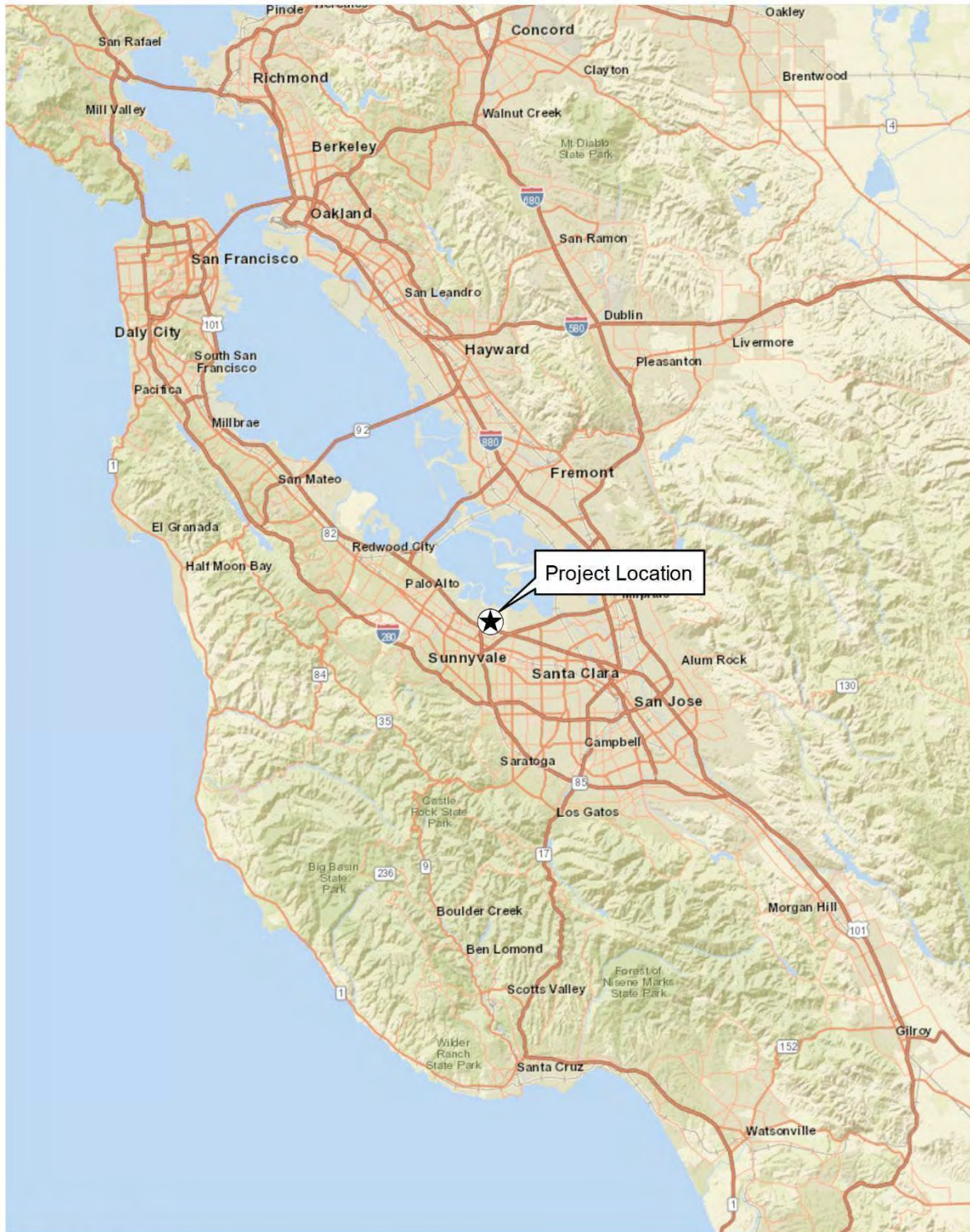
Hangar 1 (the “Hangar”) is located within the NASA Ames Research Center, located at the south end of San Francisco Bay, between the cities of Mountain View and Sunnyvale, in Santa Clara County, California. The irregularly shaped, approximately 1,930-acre property is roughly bounded to the north by San Francisco Bay, to the west by Stevens Creek, to the south by Highway 101 and Manila Avenue, and to the east by Enterprise Way and East Patrol Road. Hangar 1 is a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District, which was listed in the National Register of Historic Places (NRHP) in 1994 (NRHP #94000045), and was determined individually eligible for listing in the NRHP.

The PV leasehold of approximately 1,000 acres occupies the central and western sections of the NASA Ames property and encompasses portions of both the designated and expanded historic districts, including Hangars 1, 2 and 3, the runways, and the golf course.

A Project Location Map is included in Figure 1; a Site Map is in Figure 2; the Project Site is shown in Figure 3.

1.3 PROJECT TEAM

This study was conducted by Brenda A. Levin, FAIA, President and Principal, and Kaitlin Drisko, Project Manager, Levin & Associates Architects; Christine Lazzaretto, Managing Partner, and John LoCascio, AIA, Principal, Historic Resources Group. All are qualified professionals who meet the Secretary of the Interior’s Professional Qualification Standards (36 Code of Federal Regulations [C.F.R.] Part 61) in their respective fields.

FIGURE 1. PROJECT LOCATION MAP

Source: ESRI, AECOM, NASA

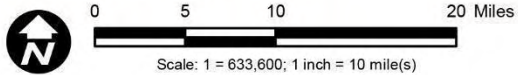


FIGURE 2. SITE MAP



FIGURE 3. PROJECT SITE

2.0 DESCRIPTION OF THE UNDERTAKING

2.1 PROJECT DESCRIPTION

Phase II of the Project involves the exterior re-cladding, seismic strengthening, and core interior improvements for occupancy of Hangar 1 and routine maintenance and repair of the functionally related Buildings 32 and 33, and is considered part of the overall Hangar 1 Rehabilitation Project, which is an undertaking per 36 CFR § 800.3(a). The Phase II Project will follow the implementation of the Phase I abatement of lead- and Polychlorinated Biphenyl (PCB)-containing paint on the steel structure of Hangar 1.

The purpose of the Undertaking is to rehabilitate and adaptively reuse Hangar 1 at Moffett Field, and maintain Buildings 32 and 33 to prevent future damage and deterioration. The need for this Undertaking is to improve Hangar 1 to full operational capability sufficient for potential future tenant uses involving research and development, including testing and light assembly uses related to space, aviation, rover/robotics, and other emerging technologies, and any other uses permitted under applicable law. It is anticipated that the Phase II Project will take up to 28 months to complete.

The Phase II Project has been designed to comply with the Secretary of the Interior's Standards for Rehabilitation, and therefore meets Programmatic Environmental Impact Statement (PEIS) Mitigation Measures CUL-1 and CUL-2, as identified in the "NASA Ames Development Plan Final Programmatic Environmental Impact Statement," prepared for NASA by Design, Community & Environment, July 2002.¹ The PEIS included mitigation measures to avoid significant impacts to cultural resources as the result of the implementation of the plan.

Other reference documents used to guide development of the Project include the "Condition Assessment and Rehabilitation Plan for Hangar 1," prepared for NASA by CH2MHill in 2011;² and the "NASA Ames Integrated Cultural Resources Management Plan," prepared for NASA by AECOM in 2014.³

The Phase II Project is broken into four major components: General/Site and Utility Upgrades; Seismic Strengthening; Exterior Rehabilitation/Re-Cladding; and Interior Rehabilitation/Occupiable Upgrades.⁴

¹ Design, Community & Environment, "NASA Ames Development Plan Final Programmatic Environmental Impact Statement," prepared for NASA Ames Research Center, July 2002.

² CH2MHill, "Condition Assessment and Rehabilitation Plan for Hangar 1," prepared for NASA Headquarters and Ames Research Center, California, November 30, 2011.

³ AECOM, "NASA Ames Integrated Cultural Resources Management Plan," prepared for NASA, November 2014.

⁴ Note that throughout the project description, the word "original" is used to refer to an architectural element/artifact/character-defining feature that may no longer be present but can be defined based on

Design Development drawings are included in Appendix A; supporting visual exhibits are in Appendix B-C; the structural strengthening approach is in Appendix D.

The architectural description, including identification of character-defining features, identification of alterations, and detailed description of the 2010-13 abatement program, is included in Section 5.2 “Architectural Resources.” It should be noted that during the 2010-13 abatement of hazardous materials, the siding, roofing, windows, and pedestrian and aviation doors of Hangar 1 were removed; and the interior structures were deconstructed.

2.1.1 GENERAL/SITE AND UTILITY UPGRADES

The Project will utilize mobilization established for the Phase I Project (abatement) including construction trailers, laydown areas, and staging of materials, supplementing where necessary.

Site Improvements

Parking and access, including restriping and area lighting, accessible parking spaces, and accessible path of travel to the building will be upgraded; there will be new paving, grading, sidewalks and site utilities as required. The existing trench drain will be maintained and protected to provide water control around the perimeter of the structure; missing or damaged trench grate will be replaced in-kind (See AD-001 for Trench Grate Protection and Removals). Existing paved areas between the Hangar and Cummins Avenue, currently used for parking, will be re-paved and re-striped, including striping for new barrier free parking spaces; new entry hardscape will be added at two locations; and raised planters will be added. To the north and east of Hangar 1 are areas of existing paving currently used for parking; these areas will be re-striped for parking, new parking lot lighting will be added, a raised accessible walkway will be added, running the length of the parking lot north to south, and new areas of hardscape will be added to define the main entry. To the south of Hangar 1 is an area of existing paving which features a large number of inset aircraft tie-downs. This area will be used for access, parking, and material storage during construction. All-weather fire department roadway access will be provided in accordance with California Fire Code (CFC) to access on-site hydrants and sprinkler point of connection. Any paving that is disturbed due to the installation of new utilities will be patched in-kind, and a transition will be created to bridge the apron grade and interior slab grade to resolve accessibility issues at each perimeter pedestrian door. See Appendix A, sheets C-001 through C-116, and sheet A-S100 for detailed site improvements information.

Due to historical activities within the former Naval Air Station Moffett Field, soil and groundwater at several locations within the PV leasehold have been impacted by volatile organic compounds, petroleum hydrocarbons, lead, polychlorinated biphenyls, and other contaminants. Due to the presence of these contaminants at levels of concern, the United States Environmental Protection Agency (EPA) identified former Naval Air Station Moffett Field as a Superfund Site in 1987. Hangar

documentation and/or field investigation. The word “existing” is used to refer to an architectural element/artifact/character-defining feature that is still present at the site.

1 is located within the Middlefield-Ellis-Whisman (“MEW”) Vapor Intrusion (“VI”) Study Area and pursuant to the MEW Record of Decision (“ROD”) Amendment for the VI pathway, the U.S. Department of the Navy (Navy) is the Responsible Party for addressing impacts due to VI. Based on the MEW VI ROD Amendment and discussions with the EPA, installation of a vapor mitigation system will be required upon Hangar occupancy. Therefore, installation of a sub-slab depressurization (SSD) system is included in the Undertaking. As part of the site improvements, enclosures may be added to obscure the SSD blower units.

Site Utility Upgrades

The project includes new utilities for electrical service, fire lines, domestic water and sewer, and telecommunications, with increased capacity for new proposed uses, to connect to Airfield systems. Existing lines will be re-used to the extent feasible, and new lines will be sited to minimize ground disturbance and reduce potential impacts to character defining features of the site.

Utility upgrades include new underground fire lines; each fire line will be installed below grade on the exterior of the building and will serve a quarter of the building. Existing fire hydrants located around the exterior perimeter of the Hangar will be reused; the placement of these existing hydrants satisfies the requirements of CFC and no new hydrant locations are required. The fire department connections for the proposed sprinkler systems will be located at the perimeter of the building. There will be four fire riser rooms installed adjacent to the main entry vestibules and cores; the annunciator panels will be located inside the entry vestibules and all fire riser piping will be located on the interior.

New domestic site water and sanitary sewer lines from Airfield systems will be provided to supply new toilet room cores distributed through Hangar 1. Existing incoming electrical service will be retained and diverted to a new electrical vault located within the perimeter of the building, at the location of an existing electrical vault. Existing vaults will be removed and replaced in kind with new electrical and communications rooms. A new back-up generator and fuel tank will be installed within a generator room located within one of the new mechanical cores, at the location of an existing electrical vault to be removed. See Appendix A, sheets C-140 through C-143 for detailed site utilities information.

Buildings 32 and 33

The functionally related Buildings 32 and 33, located immediately to the east of Hangar 1, will be retained in place. Minor exterior repairs will be completed to prevent water intrusion and further deterioration of the buildings. This will include minor roof repairs such as removal of damaged roofing, abatement (if needed), waterproofing and repair of the roof system; or replacing the roofing in-kind if repair is not feasible. Maintenance and repairs for both buildings would also include window repairs or replacement in-kind if needed, weather stripping at windows and doors, caulking and sealing to prevent water intrusion in to the buildings, and repainting the buildings’ exteriors in a compatible color. Both buildings will be avoided by all Hangar 1 construction activity during all

phases of the Project. All supervisory personnel will be informed of this requirement and, if necessary, a physical barrier (e.g. exclusion or cyclone fencing) will be erected to separate and protect Buildings 32 and 33 from construction activity at Hangar 1.

2.1.2 SEISMIC STRENGTHENING

Based on an evaluation of the deficiencies of the structural frame of Hangar 1, the project proposes a series of structural strengthening interventions to meet the requirements of the California Historic Building Code (CHBC), California Building Code (CBC), and ASCE 41, *Seismic Evaluation and Retrofit of Existing Buildings*. Deficient members constitute a small minority of the total number of members in the building's structural frame. They will be strengthened by attaching additional members of similar sizes and profiles, to maintain the overall visual effect of the hangar's exposed structural frame. See Appendix A, sheets S1.01 through S12.01, in particular Sheet S8.01, Details; and Appendix D.

2.1.3 EXTERIOR REHABILITATION/RE-CLADDING

The proposed new cladding of Hangar 1 is designed to replicate, as closely as possible, the overall visual characteristics of the original cladding, while providing improvements necessary for occupancy and maintenance including adequate waterproofing and a tempered interior environment with natural light. The original performance characteristics of Hangar 1 for thermal, daylight glare, acoustics, water/air permeability, durability, maintenance, and interior condensation were analyzed for attributes and deficiencies in order to determine characteristics for appropriate new systems. The goals for selection of the new systems were to replicate the character defining features of the original, extend the useful life of the rehabilitated Hanger, provide for long-term maintenance, and promote compatible new uses.

While no specific use for Hangar 1 has been determined at this time, the re-cladding anticipates that the building's interior will house light industrial uses that may include research and development, testing, light assembly and fabrication, and educational uses related to aviation and emerging technologies. The steel structural frame will remain intact and visible on the interior, as it was historically.

Metal Cladding

The steel frame of Hangar 1 was originally clad with Robertson Protected Metal siding, which consisted of profiled steel panels coated with layers of asphalt and asbestos felt and finished with aluminum paint. The panels had two distinct profiles – the lower, angled portions of the walls and doors, up to a point approximately 132 feet 6 inches above the Hangar floor, were clad in V-Beam Siding (“Profile One”), a corrugated panel with a trapezoidal profile approximately two inches deep (see Appendix B, page 11). The upper, curved portions were clad in Mansard Pencil-Rib Siding (“Profile Two”), with a beaded profile approximately three-quarters of an inch deep, over wood sheathing (see Appendix B, pages 13 through 15). All original exterior cladding was removed as part of the Navy's 2010-13 abatement program and is not available for re-use. The Phase II Project

proposes compatible replacement with profiled metal panels in silver aluminum color. Sheathing at the mansard level will be non-combustible metal decking, in lieu of original wood sheathing. Insulation will be sandwiched above the decking and below the cladding and will not be visible at either the interior or exterior of the structure. Hangar 1 was historically subject to interior condensation due to moisture infiltration and low interior temperatures in the morning. These new metal cladding systems will improve moisture permeability, and will provide better thermal performance and improve ventilation, which will maintain a higher interior temperature in order to reduce the condensation previously experienced at the interior. The two existing expansion joints, located approximately one-third of the way from the north and south ends of the building, will be retained. Where original visual elements existed for flashings, expansion joints, and changes-in-plane, similar visual elements will be provided. Visual changes in plane between the wall siding and mansard siding will be re-created.

Wall Siding

The largest area of metal siding on Hangar 1 has a V-shaped trapezoidal profile and V-Beam with almost 2" depth; the new aluminum siding will retain the shape and profile of the original. The panelization will match the original 30" wide x 9' long panels with exposed fasteners. Panels will be installed over the original steel channel support framework (vertical and horizontal girts). New aluminum components will be isolated from existing steel framing with synthetic shims to prevent galvanic corrosion. Siding finish will be a dull metallic silver grey, similar to the original finish. See Appendix A, sheets A-201 through A-211 and A-521 through A-522; and Appendix B, pages 11 and 12.

Mansard Siding

The upper portion of metal wall panel at the curved surfaces originally had convex ribs with half round shapes; the shallow, beaded profile of the original mansard siding was not sufficient to prevent moisture infiltration. Rather than re-create this inadequate profile, the new aluminum siding at the mansard will be a sheet standing seam product with the seam size and spacing reflecting a similar overall visual character to the original, with a smooth surface and regular pattern of seams. The taller seams will prevent moisture infiltration. Siding finish will be a dull metallic silver grey, similar to the original finish. See Appendix A, sheets A-201 through A-211, and A-512; and Appendix B, pages 13 through 15.

Roofing

The crown of the roof of Hangar 1 will be clad in new membrane roofing over steel decking, to correspond to the area of the original built-up roofing over redwood decking. The membrane roofing will perform better than built-up roofing at this very low slope and will be easier to waterproof around the multiple posts that support the roof monitor walk. This will result in less maintenance and more longevity as a roofing system. The existing monitor walk at the apex of the roof will be retained and rehabilitated; it will be elevated to provide required clearance for the new

roof below; non-combustible metal deck will be installed in lieu of the original wood planking; and the existing guard rails will be raised to meet current safety codes. See Appendix A, sheets A-103 through A-103C, and A-201 through A-211.

Concrete Stem Wall

Hangar 1's existing concrete stem wall at the perimeter of the building is in fair condition. It will be retained and repaired to the extent possible; where the existing is deteriorated beyond repair, portions may be replaced in a manner that matches the original in design, profile, dimensions, material and finish. See Appendix A, sheets AD-002, A-202, A-208, A-501 and A-541 through A-545.

Fenestration

Tier One and Tier Two Windows

The lowest band of windows of Hangar 1 ("Tier One") begins at the top of the concrete stem wall and is 24 lights wide by four lights high. The second band of windows ("Tier Two") is 24 lights wide by two lights high. They will consist of an aluminum industrial window framing system and improved with thermal breaks and insulated glazing. Details and light patterns will be similar to the historic windows to create the same visual characteristics and shadow lines of the original window systems. The upper row of lights on the Tier 1 windows will be fitted with metal louvers instead of glass to provide natural ventilation to the interior.

- Typical head: Profile of the V-beam will be visible at the head above the new internal gutter system.
- Typical horizontal band: The strong line of the intermediate horizontal mullions will have an approximately 6" flat to match the original horizontal banding of the original windows.
- Typical vertical muntin: The butt joints of the individual glass will have either a visible wet seal or a small cap to cover the seal.
- Typical jamb: Jamb flashing will overlap the corrugated V-Beam siding similar to the original condition.

The original fenestration pattern will be retained, and window openings will remain in their original locations and sizes based on archival documentation and existing girt framing. See Appendix A, sheets A-201 through A-209, A-519 through A-520B, and A-630; and Appendix B, pages 8 through 10 and 17 through 23.

Tier Three Windows (Plaza Side) and Tier Four Windows

The two upper tiers of windows have multiple rows of lights – three in the lower Tier Three at the V-Beam wall panel, and six in the upper Tier Four at the sloped mansard panel. They were originally glazed with textured corrugated wire glass lapped within steel frames. These two tiers of windows

will be replaced in their original openings with an aluminum window system and textured fluted glass. Vertical caps with butt-glazed horizontal joins will visually match the original. The original fenestration pattern will be retained, and window openings will remain in their original locations and sizes based on archival documentation and existing girt framing. See Appendix A, sheets A-201 through A-209, A-513 through A-514, A-517 through A-518, and A-630; and Appendix B, pages 8 through 10 and 17 through 23.

Tier Three Windows – Airfield Side

Openings at the Tier Three windows on the airfield (east) side of Hangar 1 will be enlarged for two reasons: (1) to increase solar heat gain in the building interior in the morning, which will help prevent recurrence of the past condensation issues; and (2) to provide additional natural light for future new uses. The existing historic window openings will be retained, and the same new aluminum industrial window systems as in the rest of the building will be installed. These will be set within an expanded glass area behind an architectural metal louver system designed to visually integrate the enlarged glazed opening with the surrounding profiled metal panels in order to minimize the visual impact to the east façade. The louver system will consist of a perforated V-Beam extrusion so that the expanded glass area is not typically visible from the exterior, and the size, shape, and pattern of the historic windows will remain visible. See Appendix A, sheets A-201 through A-209, A-515 through A-516B, and A-630; and Appendix B, pages 17 through 23.

- Typical head: Profile of the V-beam will lap with the perforated V-beam such that the transition is not visible from the exterior.
- Typical vertical lap: The V-beam profile will be lap at panel edges such that the transition is not visible from the exterior.
- Typical transition to standard window: The head, jambs and sides of the transition to the typical window will be emphasized such that in typical conditions, the window reads similar to the west side within the expanded window area with the perforated panels.

Ventilation

A new ventilation system for Hangar 1 will be provided in accordance with code requirements. The ventilation system has been designed so that a majority of interior occupied space will be ventilated passively through louvers incorporated into the top row of lights of the Tier One window system. If necessary, accommodation for mechanical ventilation has been incorporated into the plans. There is room for heating units on the mechanical decks above the new toilet and electrical pods. However, the goal is to implement natural ventilation to allow for more flexibility for future development of the interior of the Hangar without the need for additional alterations to the façade. See Appendix A, sheets A-201 through A-211, A-519 through A-520B, A-630, and M-001 through M-702.

Doors

Hangar 1 pedestrian level openings will remain in their original locations based on archival

documentation and existing girt framing. Former roll up doors will be replaced with aluminum and glass person-doors. New pedestrian level openings, where required, will have the same aluminum and glass person-doors.

- **Clamshell Doors:** The clamshell doors will be re-clad and rehabilitated. The south door will be repaired and returned to operable condition; the north door will be fixed in closed position, but the operational machinery will be left in place so that the door may be returned to operable condition in the future. Overall, the mechanical and structural elements of the door operating machinery, with some exceptions, were found to be in fair to good condition and capable of supporting satisfactory operation of the facility with minimal refurbishment. Re-cladding materials will be the same as for the exterior, and new door seals will be installed similar to the original condition. Clam shell door operability includes refurbishment of the door rails and the rail bed within the existing concrete foundations at each end of the Hangar; where the door rails meet the longitudinal rails, the existing track turntables will be protected and maintained. See Appendix A, sheets DM0.01 through DM4.01, A-201 through A-209, A-523A through A-523C, and A-525 through A-530.
- **Aircraft Door:** In addition to the clamshell doors used for moving the USS *Macon* during the 1930s, Hangar 1 provided facilities to house and maintain smaller aircraft during World War II. On the east side of the Hangar, a large door opening with a sectional door was added to facilitate the entry of these airplanes. This opening will have an overhead bi-folding glass and metal door system in the existing opening. See Appendix A, sheets A-101, A-101B, A-201, A-203, A-545, A-610, and A-630.
- **Person Doors:** The building exterior is serviced by numerous person doors including some openings added since the original construction. Most entry doors are located within the Tier One window bays. All entry doors pass through the sloped concrete foundation wall which terminates in concrete piers, and most have a small metal canopy overhang. The doors themselves will be a new aluminum storefront system. Existing steel doors at the transformer rooms will be rehabilitated to operable condition. Person doors are to be in the original locations of door openings based on archival documentation and existing girt framing; sizes may be altered to conform to functional and accessibility requirements. See Appendix A, sheets A-519 through A-520B, A-541 through A-544, A-610, A-630, A-710, and A-730.

Exterior Lighting

The original exterior lighting scheme of Hangar 1 appears to have been minimal and utilitarian. The original drawings do not specify exterior lighting. Exterior lighting fixtures are not visible in historic photos or HABS documentation, except for what appear to be two utilitarian wall-mounted fixtures flanking the aircraft doors on the east façade. Any extant exterior lighting fixtures were removed as part of the Navy's 2010-13 abatement program. New lighting systems will be installed, including outside building entrances/exits, lighting for maintenance, area safety lighting, emergency lighting,

and related lighting controls. Light fixtures for the building entrances will provide code required illumination. New exterior lighting fixtures will be simple, industrial-style fixtures compatible with the historic utilitarian character of Hangar 1. In addition, the exterior of the building will be illuminated for aesthetic purposes. In-ground uplighting will be installed around the perimeter of the building to wash the walls, and fixtures concealed on the monitor will wash the roof. See Appendix A, sheets E-120 through E-126, and E-129A through E-129C; and Appendix B, pages 24 through 26.

Lightning Protection

A lightning protection system will be installed due to Hangar 1's metal construction, large size, and exposed location. The system will consist of four, 20-foot-tall masts mounted along the crest of the roof. Conductors will run from each mast, through the roof, and along the interior of the structure to connect to a ground ring that encircles the building at a minimum depth of 30 inches below grade. See Appendix A, sheet E-113.

2.1.4 INTERIOR REHABILITATION/OCCUPIABLE UPGRADES

The Phase II Project will preserve Hangar 1's steel structural frame, including the trusses supported on rigid A-frames, x-bracing, girts, clamshell doors and catwalks, and will reinforce them as necessary to seismically upgrade the building. Deficient members constitute a small minority of the total number of members in the building's structural frame. They will be strengthened by attaching additional members of similar sizes and profiles, to maintain the overall visual effect of the hangar's exposed structural frame. The frame will remain exposed and visible on the building's interior, as it was historically.

The existing catwalks will have new non-combustible metal decking, to replace the original wood sheathing, and new metal guardrail extensions that are compatible with the originals to meet current code requirements.

The existing mezzanine structure (referred to as level two in the Project drawings in Appendix A) is metal framing with flat metal plate floor structure exposed at both the underside and floor level. The existing mezzanine/level two framing will be altered only as needed to accommodate new or altered stairs and to meet code requirements and will remain as existing.

Utility and Toilet Rooms

Existing electrical rooms and toilet rooms with concrete walls have been determined to be structurally inadequate and will be removed. Existing toilet rooms with partial height stem walls, metal columns and metal roof structures are no longer compliant and will also be removed. New cores with entrance vestibules, toilet rooms, electrical rooms, telecommunications and mechanical rooms will be constructed at multiple locations along the east and west sides of the building, under the mezzanine/level two. These new cores will be of cast-in-place concrete construction with

concrete lids serving as mechanical platforms; the mechanical equipment will be screened from view by parapets. See Appendix A, sheets A-101 through A-101C, A-312, and A-401 through A-454; and Appendix B, pages 27 through 31.

Stairs

The existing metal stair systems vary in their construction methods. Many were likely added or altered over time. The main egress stairs are typically concrete-filled pan systems with open risers. These are not compliant with current code requirements for headroom clearance, landings or railings. These stairs will be reconstructed and reconfigured to provide required clearances and railings, using similar concrete and metal fabrications in similar locations as the originals. Other utility stairs serving original upper decks and mezzanine/level two will be removed in their entirety as they are no longer functionally required. See Appendix A, sheets A-101 through A-102, A-302 through A-316, and A-461 through A-471; and Appendix B, page 32.

Conveyance Systems

The existing elevator tracks and pit will be retained; a new guardrail will be installed around the pit to meet current safety codes. See Appendix A, sheet A-551 for typical guardrail details. The cab and equipment are no longer extant. The original rail girder system above the mezzanine structure/level two at the east and west was used to hoist and transfer equipment within the hangar. The original girder and hoisting system are removed; the metal girder brackets are extant and will be retained.

Cork Room

The original cork room contained walls lined with cork and piping for gas to fill the dirigibles; the wall finishes and piping have been removed. Metal piping brackets and metal wall framing are extant at the original cork room and will be retained. See Appendix A, sheet A-102.

Floor

The original concrete floor has been altered and patched over time with both concrete and asphaltic concrete and is cracked and uneven. There are several features added over time such as concrete curbs, likely for added partitions, and remnant artifacts such as stair runs that no longer serve a built-out floor level within the Hangar structure. In order to provide an accessible path of travel and a flat floor system, the non-original artifacts will be removed, and the non-compliant level changes will be ground and smoothed. The floor slab will be patched and repaired in the main volume of the Hangar; where electrical vaults are removed, the floor slab will be replaced to match the existing and no vapor barrier will be provided. Non-original asphalt and non-original topping slab will be removed.

Remnants of the original track rails and tie downs are visible in the floor, particularly at the south end of the structure. Some are covered with later concrete toppings and asphalt patching; some portions have been removed. The Project will retain and repair the remaining rails. See Appendix A,

sheets AD003 through AD007, V-100 through V-312 (for ground survey information on condition of the existing slab) and AI101.

Interior Lighting

The original interior lighting scheme of Hangar 1 was designed to illuminate the cylindrical hull of the USS *Macon* from all sides. The lighting system consisted of utilitarian, industrial-style fixtures in a variety of sizes and designs. The lights were mounted on the building's steel frame in a regularly spaced grid pattern that extended over the entire surface of the parabolic vault.

The proposed new interior lighting layout will recall, but will not recreate, the historic layout. The historic fixtures were positioned out of reach of the catwalks; replicating these locations would make regular maintenance extremely difficult. The new layout will shift the fixture locations as needed to locate them within reach of the catwalks but will recall the regularly spaced grid pattern extended over the entire surface of the parabolic vault that characterized the historic layout. The new fixtures will be utilitarian, industrial-style fixtures in sizes and designs similar to the originals. These will be supplemented with additional lighting as needed to provide the required illumination for task lighting and exiting. See Appendix A, sheets E-127A through E-127C; and Appendix B, pages 33 through 36.

2.2 GROUND DISTURBING ACTIVITIES

Ground disturbance will be needed for the installation of subgrade soil/vapor barrier system, utility tie-ins/capping, parking and access improvements, and for potential structural upgrades, as described below:

- Removal and replacement of pavement at two locations at the west side of the Hangar for domestic water/fire mains to water tie-ins approximately 80' from the building exterior. Trench dimensions approximately 5' wide x 6' deep.
- Removal and replacement of pavement at two locations at the east side of the Hangar for domestic water/fire mains to water tie-ins approximately 80' from building exterior, and for sanitary laterals to sewer lines approximately 30' from building exterior. Combined trench dimensions approx. 10' wide x 6' deep; domestic water trench dimension approximately 5' wide x 6' deep.
- Removal and replacement of pavement and curbing on the west side of the building to add accessible access, passenger drop off, planters, and pedestrian routing. On the east side of the building, pavement will be repaired, curbing will be replaced, and sidewalk will be added. New parking striping and signing will be added on the west, north, and east side of the building.
- Removal and replacement of soil and pavement at one location at the west side of the Hangar to provide new electrical and telecommunication service from approximately 20'

- from building exterior. Trench dimensions approximately 5' wide, to depth of existing electrical and outside service provider.
- Selective removal and replacement of existing paving at east, north and west of Hangar to provide power to site lighting standards. Projected total of 80 -90 poles. Light poles will require excavation of approximately 5-foot square by 10-foot deep, typical trenching to provide conduit will require a saw cut approximately 2-feet wide and 3-feet deep.
 - Removal and replacement of soil and pavement to provide lightning protection around Hangar perimeter. Projected trench dimensions approximately 2' wide x 3' deep.
 - Removal and replacement of soil and pavement at the west side of the Hangar approximately 10' from building exterior near Exegesis Street to provide a remote fuel point for new emergency generator and for mobile generator connection cubicle. Trench dimensions approximately 5' wide x 3' deep.
 - Selective concrete work may be required for structural upgrades to the existing Hangar foundations, either for new grade beams or enlarged pile caps. Small diameter micropiles (6 to 14 inches in diameter) may be installed adjacent to existing pile cap foundations if required.
 - New exterior concrete slabs on grade will be underlain by at least 12 inches of select fill or lime-treated soil, which would extend at least 2 feet beyond the slab edges, where feasible.
 - Refurbishment of the south clam shell door rails and the rail bed may be required within the volume of the existing concrete foundations.
 - Anticipated structural upgrades to the Hangar interior are anticipated to include slab-on-grade modifications for new stairs, depressed slabs, slopes to drain, and shallow spread footings at any new steel post location to a minimum depth of 2-½ feet below adjacent grade. New subgrade preparation beneath new interior slabs on grade includes at least 24 inches of non-expansive, select fill or lime-treated soil to mitigate the effects of expansive soil beneath the slab.
 - Removal and replacement of slab on grade for combined building utility trenching (water, fire water, electrical, telecommunications, sewer, sub-slab depressurization) to new electrical vaults, comms rooms, and toilet rooms at three east-west locations, and two north-south locations. Combined trench dimensions are projected to be approximately 3-12' wide, and 3-10' deep, depending on the services and locations.
 - To inform the design of a future SSD system, a Pilot Test will be conducted this summer. The Pilot Test will be conducted using three test trenches within Hangar 1 to assess variability in different areas of the hangar that may have differing characteristics. The test trenches will be roughly 60 feet long, 15 inches wide, and up to 30 inches deep. Temporary sub-slab vacuum monitoring points will be installed in the vicinity of each of the Pilot Test SSD trenches. The vacuum monitoring points will be small holes (roughly 1/4-inch to 3/8-inch in diameter) and will be drilled to general the depth of the concrete (i.e., between 6- and

8-inches deep). A tight-fitting hose barb will be inserted into each monitoring point and sub-slab soil vapor will be extracted from each suction trench using a portable vapor extraction system. It is anticipated that SSD testing will take between 2 and 3 days. On completion of all activities related to the Pilot Test, the SSD suction points and vacuum monitoring points will be abandoned by filling with a non-shrink quick-drying cement. Based on the results of this study, the design of the SSD system will be finalized and submitted to the EPA for review and approval of its conformance with the requirements of the MEW VI ROD Amendment.

- While design of the SSD system has not been finalized, it is anticipated that parallel trenches will be installed in the north-south direction in or to apply the SSD system over the large floor area of the hangar. Each trench will be filled with gravel and a horizontal perforated pipe, such as a 6-inch diameter slotted HDPE drain pipe. From the middle of each perforated pipe an underground lateral conveyance pipe (non-perforated HDPE) will be installed to connect the perforated pipe in the trench to the blower system.
- As part of the SSD system, either one or two blower and emissions control system units may be located within approximately 150 feet of the Hangar 1 perimeter. The emissions point (stack) for each blower system would be a minimum of 10 feet high, at least 2 feet above the blower system area fence or building height and at least 10 feet from any building opening or air intake. The area required to house an SSD blower and emissions control system is approximately 20 feet by 22 feet. The final location(s) of the SSD blower and emissions control system(s) will be developed during final design in coordination with NASA and the EPA.
- To minimize overall ground disturbance, if SSD-related ground disturbance is required, either within the Hangar 1 footprint and outside the Hangar 1 perimeter, it will be coordinated with disturbance occasioned by other work.
- Where feasible, ground common trenching will be employed to reduce the magnitude of ground disturbance.

3.0 AREA OF POTENTIAL EFFECTS

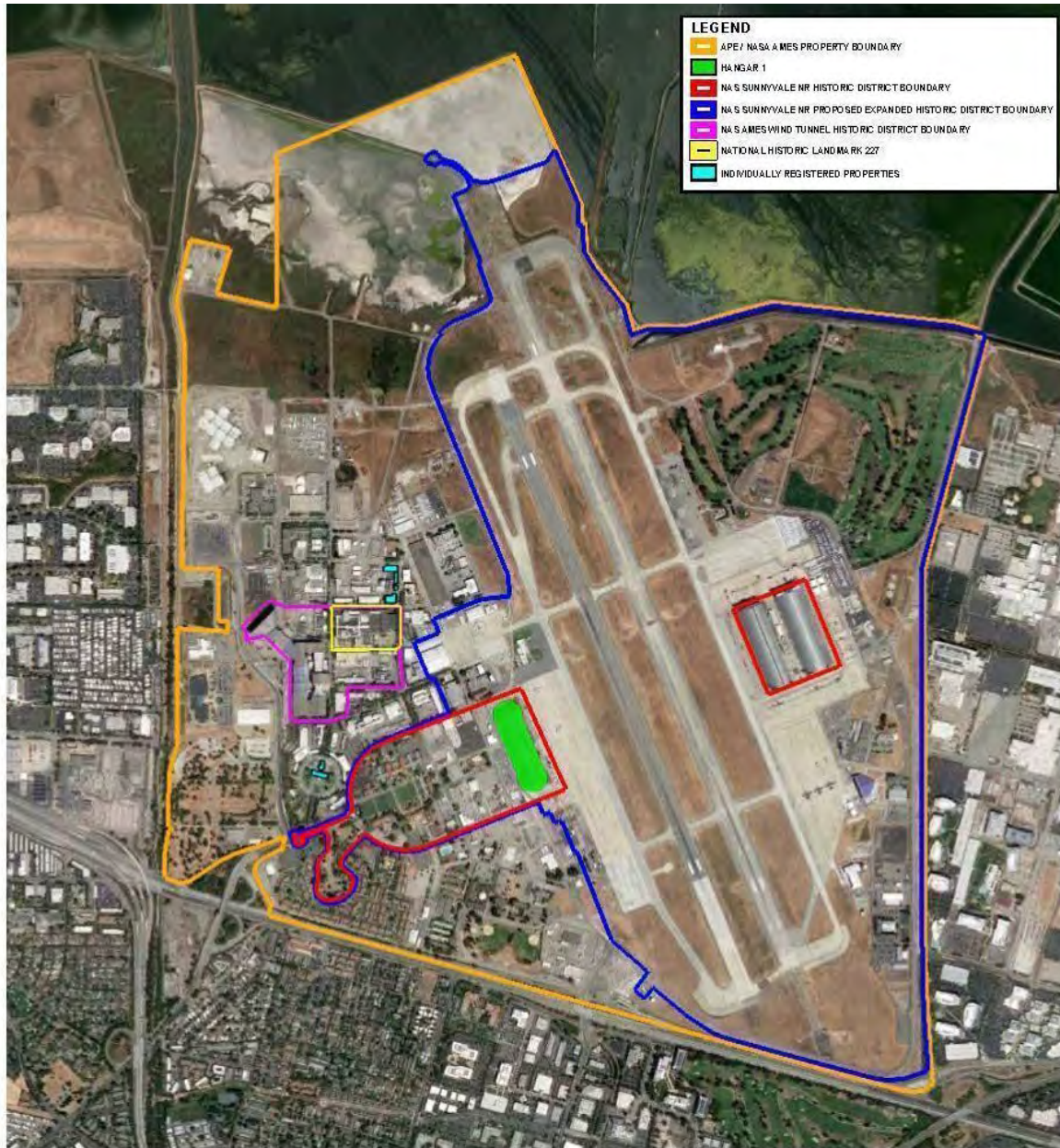
The Area of Potential Effects (APE) is defined as the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 Code of Federal Regulations [CFR] Part 800, Protection of Historic Properties, Section [§]800.16(d)). These changes may include physical destruction, damage, or alteration of a property; change in the character of the property's use or of physical features within its setting that contributes to its historic significance; and introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features (36 CFR § 800.5(a)(2)). The locations of various known historic properties within the Project vicinity were carefully considered. Specifically, the APE includes areas of potential physical disturbance for the proposed improvements and related construction impact areas.

The APE for the Undertaking is the property line boundary of the NASA Ames Research Center, Moffett Field, CA. Historic properties within the APE include the National Register-designated United States Naval Air Station, Sunnyvale Historic District; the 2013 extended NAS Sunnyvale Historic District boundary, which includes the airfield; the National Register-designated Ames Wind Tunnel Historic District; the Unitary Plan Wind Tunnel, which was designated a National Historic Landmark in 1985; and the Arc Jet Complex and Flight and Guidance Simulation Laboratory.

A map of the APE is included in Figure 4.

The Phase II Project proposes limited ground disturbance (Appendix A, Plan Sheet F-101). Therefore, a vertical APE of ten feet is proposed for the Phase II Project in the area shown in the map in Figure 5.

FIGURE 4. AREA OF POTENTIAL EFFECT



Source: Google Earth



FIGURE 5. MAP OF GROUND-DISTURBING WORK



4.0 CONSULTING PARTIES

Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP, “Protection of Historic Properties” (36 CFR Part 800.2(c)(3-5) and Part 800.2(d)). Coordination and consultation with the public, public agencies, Native Americans, the California State Historic Preservation Officer (SHPO), appropriate Tribal Historic Preservation Officers (THPOs), ACHP, and other consulting parties in a manner that reflects the nature and complexity of the undertaking is a key aspect of Section 106 compliance.

For the proposed Undertaking, the following parties were consulted:

- The Moffett Field Historical Society
- The City of Sunnyvale, California
- The City of Mountainview, California
- Sunnyvale Historical Society
- Mountainview Historical Association
- History San Jose
- Silicon Valley Historical Association
- California Preservation Foundation
- National Trust for Historic Preservation

There are no Federally Recognized Tribes associated with this location; however, the following groups have been consulted in compliance with 36 CFR Part 800.4(a)(4):

- Amah Mutsun Tribal Band
- Amah Mutsun Tribal Band of Mission San Juan Bautista
- Indian Canyon Mutsun Band of Costanoan
- Muwekma Ohlone Indian Tribe of the San Francisco Bay Area
- Ohlone Indian Tribe

The letters sent to the potential consulting parties listed above are included in Appendix E. Due to current shelter-in-place restrictions in California, the letters were sent via mail with follow-up correspondence by email. As of the completion of this report, the Moffett Field Historical Society, the Preservation Action Council of San Jose, and the Ohlone Indian Tribe have elected to participate as consulting parties.

A public outreach meeting was held on August 27, 2019. The meeting was held as part of the Engineering Evaluation/Cost Analysis process. During the meeting, representatives from NASA, the Environmental Protection Agency (EPA), PV, and EKI Environment & Water, Inc. provided an overview and history of the environmental issues at the site; previous steps to mitigate these issues, including a summary of the 2010-13 Non-Time Critical Removal Action (“NTCRA”) including the

removal of the exterior wall cladding, deconstruction of interior structures, and application of CM15 coating; and the currently proposed abatement methodology and schedule. There were approximately 50 people in attendance. No additional comments were received following the meeting.

5.0 IDENTIFICATION OF HISTORIC PROPERTIES

Historic properties, as defined in 36 CFR Section 800.16(l)(1), include any district, site, building, structure, or object that is included in or eligible for listing in the NRHP.

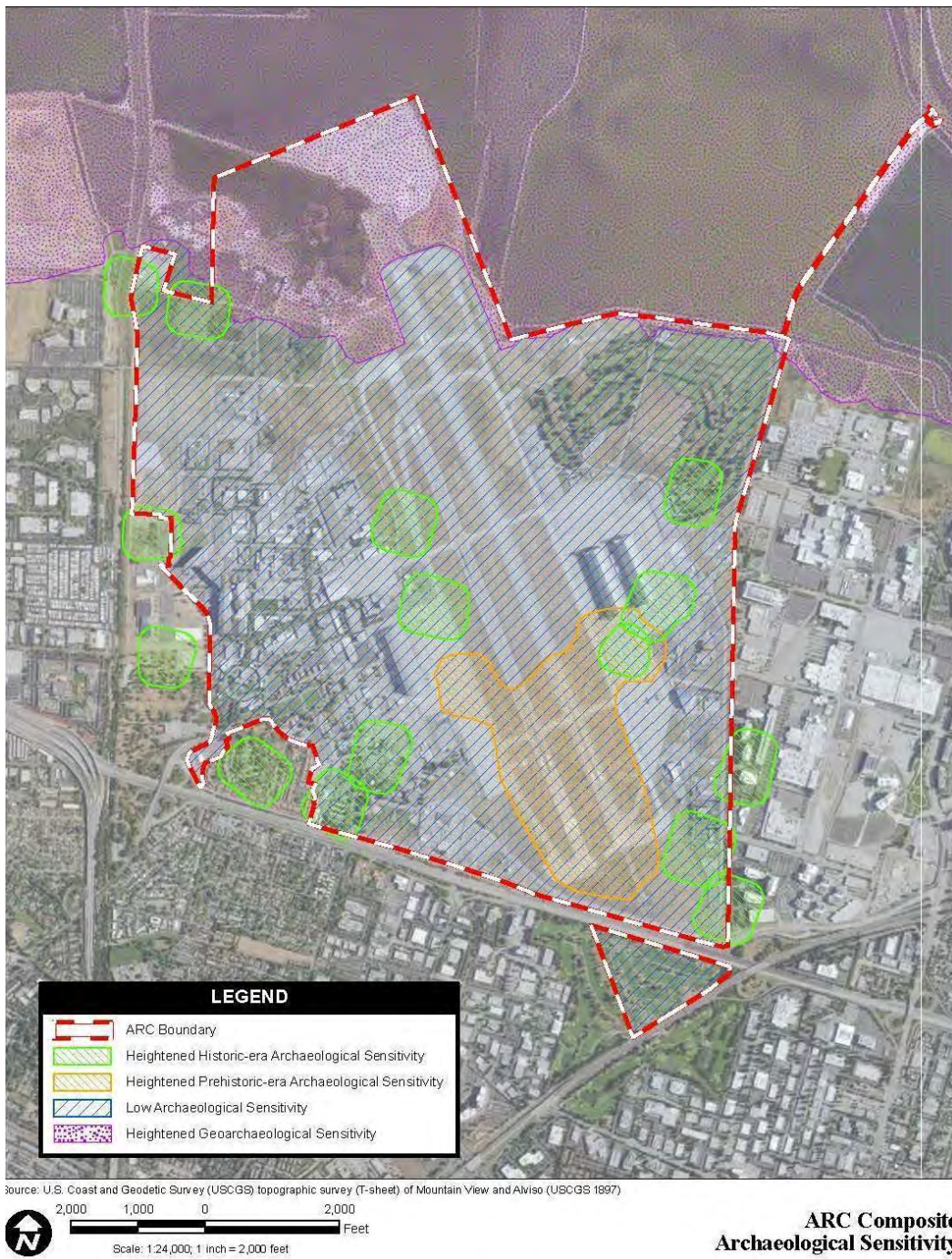
5.1 ARCHAEOLOGICAL PROPERTIES

In February 2017, AECOM prepared for NASA the “NASA Ames Research Center Archaeological Resources Study,” to provide guidance for archaeological resources management at ARC in support of NASA’s obligations under the NHPA of 1966.⁵ The study identified the potential for archaeological resources at ARC through an extensive records search of prior surveys, previously recorded resources, historic maps, Sacred Land Files from the Native American Heritage Commission, and hundreds of geotechnical investigations conducted at NASA ARC. Using these sources, the study presented a series of maps based on cumulative source materials that illustrate areas of archaeological sensitivity. The study identified four categories of archaeological sensitivity:

- Heightened Historic-era Archaeological Sensitivity: Locations where pre-1931 development occurred, namely structures associated with agricultural activities in the area.
- Heightened Prehistoric-era Archaeological Sensitivity: Locations where archaeological materials that reflect earlier periods of human occupation and activity, spanning an approximate 13,500 years.
- Heightened Geoarchaeological Sensitivity: Locations where materials related to older periods of human activity that were subject to geological processes over thousands of years.
- Low Archaeological Sensitivity: Areas within NASA ARC that were not designated within the aforementioned categories were determined to have a low potential for containing archaeological resources.

The study received concurrence from the SHPO on June 22, 2017, for future use as the baseline study for archaeological investigations. According to the composite sensitivity map included in that report and shown in Figure 6, the Undertaking is primarily located in an area of low archaeological sensitivity and has a low potential for containing archaeological resources. A small portion of the northeastern extent of the APE is located within or adjacent to areas identified in the 2017 report as having heightened sensitivity for historic-era archaeological resources, based on the mapped locations of structures on historic-era map. Ground disturbance in this area will be very limited and primarily contained to areas of prior disturbance associated with the construction of Hangar I. As such, it is anticipated that there is a low potential for encountering potentially significant intact archaeological resources during construction.

⁵ AECOM, “NASA Ames Research Center: Archaeological Resources Study,” February 2017.

FIGURE 6. ARCHAEOLOGICAL SENSITIVITY MAP

5.2 ARCHITECTURAL RESOURCES

Above-ground historic properties located within MFA have been subject to numerous previous studies in efforts to inform an understanding of the historic significance of the site. These studies have been used to inform this report and determine whether the Undertaking may have potential effects on historic properties within the APE. These studies include:

- “U.S. Naval Air Station Sunnyvale, California Historic District National Register of Historic Places Nomination,” Bonnie Bamburg, Urban Programmers, 1994.
- “Historic Property Survey Report for the Airfield at NASA Ames Research Center, Moffett Field, California,” AECOM for NASA, 2013.

The Undertaking site is located within the boundary of the NAS Sunnyvale Historic District (both the original district as designated in 1994 and the expanded district identified in 2013).

NAS Sunnyvale Historic District

The United States Naval Air Station (NAS) Sunnyvale, California Historic District as listed in the NRHP is a non-contiguous historic district with two periods of significance: 1930-1935 and 1942-1946. The historic district consists of the original portions of Shenandoah Plaza at the west side of the airfield, including Hangar 1 and the U.S. Army Wescoat Housing, as well as the 1941 and 1943 Hangars 2 and 3 on the east side of Moffett Federal Airfield.

As summarized in the NRHP nomination, the district is significant under Criteria A and C:

In the nation's quest to provide security for the lengthy expanse of its coastlines the opportunity for air reconnaissance was realized by the futuristic Admiral William A. Moffett. Through his efforts, two Naval Air Stations were commissioned in the early 1930s to port the two U.S. Naval Airships (dirigibles) he believed capable of this challenge. The Naval Air Station Sunnyvale was the Pacific Coast location selected, designed, and developed to port the U.S.S. MACON (ZRS 5). The immense structure, Hangar 1, designed to house the U.S.S. MACON, with its larger counterpart in Akron, Ohio, remain the two largest structures in the United States without internal support. At the onset of WWII, the base was expanded with Hangars 2 and 3 which were designed to accommodate the smaller blimps and balloons used for reconnaissance, until the range of heavier than air aircraft (airplanes) was sufficient to patrol the coast. The significance of the U.S. Naval Air Station Sunnyvale Historic District is attributed to its association with the expanding defense capabilities of the U.S. Navy, the engineering technology found in lighter than air ships, the design of the hangar and system for porting the dirigible and in the plan and architectural style of the station designed to support this defense technology. The significance of Hangar 1 was recognized when it was designated a Naval Historical Monument. It has been designated a California Historic Civil Engineering Landmark by the San Francisco section, American Society of

Civil Engineers, and has been determined eligible for listing in the National Register of Historic Places by the U.S. Navy in consultation with the California State Historic Preservation Officer. The entire historic district is supported for listing in the National Register of Historic Places at the National level of significance under Criterion A for its association with coastal defense and naval technology that has made a significant contribution to the broad pattern of our history; and Criterion C reflecting the distinctive type, period, method of construction and high artistic values that are represented in the 1933 station plan and buildings. In 1942, the station was recommissioned, U.S. Naval Air Station, Moffett Field, in recognition of the significant contribution to naval history by Admiral Moffett, contributions that have gained him the unofficial title, “Father of Naval Aviation.”⁶

The 1930-1935 period of significance reflects the early history of the site, when it was commissioned and developed specifically for the dirigible program. Hangar 1 was the first building constructed on the site, followed by the complex of buildings to the west of Hangar 1 that include administration, housing, gymnasium, instruction, and other buildings that were all constructed to support the activities in Hangar 1. Following the dissolution of the dirigible defense program in 1935, the facility was used by the Army; in 1940, it was converted to the West Coast Air Corps Training Facility. Following the United States entry into World War II, the base was returned to the U.S. Navy and in 1942 it was recommissioned Naval Air Station Moffett Field. The return to Naval command was to provide expanded facilities for small blimps and balloons used for coastal observation; in 1942-43 Hangars 2 and 3 were constructed for this purpose. The second period of significance for the historic district is 1942-1946, reflecting the site’s use by the Navy during World War II.⁷

Expanded Historic District

In 2013, NASA determined that the airfield and its component features were eligible for listing in the National Register under Criterion A as contributors to the NAS Sunnyvale Historic District, with an additional period of significance of 1942-1961, reflecting the jet aircraft program at the airfield. On June 6, 2013 the SHPO concurred that the airfield contributed to the significance of the NAS Sunnyvale Historic District. In addition, the SHPO recommended that NASA develop a list or table of contributors to the district, specifying the character-defining features of the airfield, including landscape design. The nomination was not formally updated to include these areas.⁸

⁶ Bonnie Bamburg, “National Register of Historic Places Registration Form: United States Naval Air Station Sunnyvale, California/U.S. Naval Air Station Moffett Field Historic District,” November 9, 1991, section 8, page 1.

⁷ Information about the period of significance excerpted from the National Register of Historic Places Registration Form, section 8, pages 4-5.

⁸ Excerpted and adapted from AECOM, “Historic Property Survey Report for the Defense Fuel Support Point Closure Project at Ames Research Center, Moffett Field, California,” April 2016, 16-19.

Later in 2013, at NASA's request and under the SHPO's recommendation, AECOM prepared the "Historic Property Survey Report for the Airfield at NASA Ames Research Center, Moffett Field, California." The purpose of that study was to evaluate the airfield as a landscape, and to evaluate its eligibility and integrity. The study recommended the expansion of the NAS Sunnyvale Historic District boundary to include the adjacent airfield. The statement of significance for the airfield is as follows:

The Airfield is nationally significant under Criterion A as the central core facility of aviation-related research programs, as well as significant transport, training, and other aviation uses at the property. The Airfield's landscape is composed of a collection of buildings and structures that contribute to the adjacent NAS Sunnyvale Historic District under Criterion A. The Airfield's inclusion in the existing historic district expands the district's currently defined significance to include World War II and ongoing use of the Airfield for Cold War-era NACA, NASA, and military missions.⁹

The 2013 study recommended a period of significance of 1930-1961 for the district to include significant post-World War II operations at the airfield, and identified a preliminary list of airfield features that could potentially contribute to the expanded historic district based on general association and age related to the revised period of significance. However, these features were not fully evaluated for National Register eligibility and did not receive a formal determination of eligibility. There was no formal response from SHPO regarding concurrence with the 2013 study's preliminary list of airfield features.¹⁰

The SHPO has found it appropriate to consider the identified potential contributors to the expanded historic district as historic properties during subsequent consultation for Section 106 of the National Historic Preservation Act.

Hangar 1

Hangar 1 is a contributor to the NAS Sunnyvale Historic District, associated with the first period of significance of 1930-1935. In addition, in 1988, Hangar 1 was determined individually eligible for listing in the NRHP by consensus through Section 106 process under Criterion A for its association with the dirigible program of the U.S. Navy during the interwar period and World War II, and under Criterion C as a milestone of military engineering. It has also been recognized as an Engineering Landmark by the American Society of Civil Engineers.

⁹ AECOM, 16-19.

¹⁰ AECOM, 16-19.

Buildings 32 and 33

Buildings 32 and 33 are contributors to the NAS Sunnyvale Historic District, associated with the first period of significance of 1930-1935.

Summary

Based on the previous studies, above-ground historic properties are known to exist within the APE. Contributors and non-contributors to the designated and expanded historic district are listed in the table in Appendix F. Detailed information on all of the historic properties (including their historic use and the criteria under which they were evaluated) can be found in the documents identified in the previous studies listed above.

AFFECTED HISTORIC PROPERTIES

Of the identified above-ground historic properties located within the APE, only Hangar 1, Buildings 32 and 33, and the NAS Sunnyvale Historic District have the potential to be physically affected by the Phase II Project. Therefore, they are the only historic properties within the APE that are located in the Area of Direct Impact.

Although adjacent to the Phase II Project, the potential for indirect impacts to Shenandoah Plaza, or the Historic District as a whole through the visual or contextual change resulting from the rehabilitation of Hangar 1 is minimal. The nature of the rehabilitation work will ensure that all activities are contained within a strictly controlled perimeter. The visual context and setting of the Historic District are anchored in the formality and symmetry of the Spanish Colonial Revival-style Shenandoah Plaza campus, the utilitarian character and expansive hardscape of the airfield, and the iconic mass of Hangar 1. The rehabilitation will re-clad the exterior in a material compatible with the original metal siding (removed during hazardous materials remediation in 2010-13) returning Hangar 1 to its historic appearance. The scope of work for Buildings 32 and 33 is limited to routine maintenance, repair, and in-kind replacement of deteriorated exterior features, if needed. Therefore, the Phase II Project will not alter the historic appearance of Hangar 1 or Buildings 32 and 33, and it will not change the setting of adjacent buildings or the Historic District.

Site and Setting

The Historic District is located within NASA ARC. NASA ARC is located at the south end of San Francisco Bay, between the cities of Mountain View and Sunnyvale, in Santa Clara County. The irregularly shaped, approximately 1,930-acre property is roughly bounded to the north by San Francisco Bay, to the west by Stevens Creek, to the south by Route 101 and Manila Avenue, and to the east by Enterprise Way and East Patrol Road.

The NRHP-listed historic district is a non-contiguous district that occupies two parcels within the larger NASA Ames property. One is an irregularly shaped parcel of approximately 85.5 acres located in the southwest portion of the NASA Ames property. This encompasses Hangar 1 and Shenandoah Plaza, the adjacent campus of buildings constructed in the 1930s to support dirigible operations on the site. The second portion of the non-contiguous district is located more than a half-mile away

from the first, on the opposite side of the diagonal runways that roughly bisect the NASA Ames property from northwest to southeast. This second portion is a rectangular parcel of approximately 24.5 acres that encompasses Hangars 2 and 3 and the ancillary buildings and structures between them.

The physical character of the NASA Ames property varies widely due to the property's large size, numerous periods of development, and multiple uses. Shenandoah Plaza, in the southwest portion of the designated National Register district, is characterized by its one- and two-story Spanish Colonial Revival buildings, curving drives, expansive lawns, and axial relationship to Hangar 1 which forms a prominent backdrop to the smaller-scale buildings. The central portion of the property is dominated by the vast open space of the runways, nearly two miles long and more than a half-mile wide, and the adjacent concrete taxiways and aprons flanking Hangars 1, 2 and 3.

The northeast corner of the property is also characterized by open space, in this case the greens of the Moffett Field Golf Club, which utilizes the otherwise empty safety zone surrounding the munitions bunkers.

The remainder of the NASA Ames property is characterized by a mixture of utilitarian industrial, office and residential buildings, apparently developed as needed over the years by NASA without benefit of any encompassing master plan.

Hangar 1

Hangar 1 is flanked to the west by Cummins Avenue and Shenandoah Plaza, to the north by Bushnell Road, and to the east and south by a scored concrete apron. Buildings 32 and 33 are located immediately east of Hangar 1, at the edge of the apron. Metal drainage grates form a continuous line around the building's perimeter, and planting beds extend along its east façade.

Hangar 1 has an oblong plan, approximately 1,100 feet long by 300 feet wide, and a parabolic profile approximately 200 feet high at its crown. It is constructed of steel truss frames on a battered concrete stem wall. The rounded north and south ends of the building are enclosed with full-height, steel-framed clamshell doors, consisting of two panels each. Each door panel sits on nine wheeled trucks that roll on standard gauge steel railroad tracks embedded in the concrete floor slab. The tracks extend beyond the building enclosure to allow the doors to roll into a fully open position. Concrete door stops incorporated into the stem walls at the end of each track prevent the doors from opening too far. Each door panel is operated by a 150-horsepower electric motor that retracts the panel to its open position.

The steel frame of Hangar 1 was originally clad in Robertson Protected Metal siding, profiled steel panels coated with layers of asphalt and asbestos felt, finished with aluminum paint. The panels had two distinct profiles. The lower, angled portions of the walls and doors, up to a point approximately 132 feet 6 inches above the hangar floor, were clad in a corrugated panel with a trapezoidal profile approximately two inches deep. The upper, curved portions were clad in a mansard sheet with a

beaded profile approximately three-quarters of an inch deep. The Navy removed the siding panels in 2010-13 after it was discovered that the coatings were leaking toxins including asbestos, lead, and polychlorinated biphenyls (PCBs) into the stormwater settling basin and retention ponds. A detailed description of the abatement program undertaken in 2010-13 is included below.

The crown of Hangar 1, an area approximately 40 feet wide running the length of the building, was originally clad in a built-up roofing system over redwood decking. The built-up roofing system and decking were removed by the Navy in 2010-13. A continuous roof vent and a raised walkway run the length of the crown. The walkway is supported by a steel frame and has steel pipe railings.

Hangar 1 originally had four horizontal bands of rectangular windows on its east and west façades, and two bands on each of the clamshell doors on the north and south façades. All windows had steel angle frames and mullions. The windows in the two lower bands were glazed with flat wired glass; those in the two upper bands were glazed with corrugated wired glass. The two lower bands of windows on the east and west façades were all twenty-three lights wide, and the two upper bands were twenty-one lights wide; those in the first band were four lights in height, those in the second two lights, those in the third three lights, and those in the fourth six lights. The windows in the clamshell doors continued the second and third bands and were six lights wide at the lower band, five lights wide at the upper. The windows were removed by the Navy in 2010-13 due to their extremely poor condition.

Hangar 1 was originally accessed by ten personnel doors, five each on the east and west façades. The doors were incorporated into the lowest band of windows in alternating bays and were recessed behind the battered concrete stem wall and metal façade. Additional personnel doors were added over time. All doors were removed by the Navy in the 2010-13 abatement.

There were originally six overhead truck doors on the west façade and five overhead truck doors and one aviation door on the east façade, alternating with the personnel door bays. These doors were all removed by the Navy in the 2010-13 abatement.

The interior of Hangar 1 consists of a vast central open space with a concrete floor and exposed steel framing, designed to house the USS *Macon*. The floor is embedded with multiple tie-downs used to secure the *Macon* in place, and remnants of standard gauge railroad tracks that facilitated the dirigible's travel between the hangar and the exterior mooring circles.

The central open space was flanked along its long east and west sides by support facilities at the ground level and two mezzanines above (levels two and three). These included workshops, storage spaces, offices, toilets, and specialty spaces such as the "Cork Room," so called because of the six-inch-thick cork lining its interior walls. This room was used to dry the *Macon*'s helium cell bags. These spaces were altered in later years and were removed entirely by NASA in the 2010-13 abatement. Some interior concrete partitions at ground level, the mezzanine/level two and three framing and decking, the Cork Room wall framing, and a series of stairs, railings, ladders, and catwalks remain in place. Two elevators were originally installed to provide access between the

ground floor and the top of the hangar. The elevators operated on steel rails mounted to the hangar structure. The elevators have been removed but the rails remain in place.

Buildings 32 and 33

Buildings 32 (North Floodlight Tower) and 33 (South Floodlight Tower) are located on the edge of the concrete apron immediately east of Hangar 1. They are designed in the Streamline Moderne style and were constructed in 1934. They were originally identical mirrored buildings with irregular plans and complex massing. Each consists of a two-story tower with a square plan and flat roof, with a projecting two-story battered corner tower with a circular plan and flat roof. The exterior walls of both buildings are finished with smooth cement plaster, a projecting water table, and a prominent stringcourse between the first and second floors. Fenestration consists of punched, rectangular openings with six-over-six wood-sash double-hung windows in the square portion of each tower; and fixed, six-light metal-sash windows in angled bows in the circular portion of each tower. The primary entrance of each tower consists of a recessed door on the west façade, now blocked with plywood. The doors are accessed by concrete steps and stoops.

In 1940, an air traffic control room was added to the top of the South Floodlight Tower, increasing its height to three stories.

Hazardous Materials Abatement

In 1994, NASA Ames acquired stewardship of the property from the Navy; however, as the federal lead agency, the Navy retained primary responsibility for identifying appropriate requirements at Hangar 1, including necessary abatement. PCBs were detected in the storm water settling basin at Moffett Field in 1991, 1997, 1999, and 2002. As a result, in 2002 an investigation was undertaken to test the building materials in Hangar 1 for PCBs and other potential contaminants, specifically lead and asbestos. The results of this sample and analysis program confirmed that the Hangar 1 siding, a composite corrugated metal material commercially known as Robertson Protected Metal, contained PCBs and asbestos and that the lead-based paint (LBP) used to cover both the siding and steel frame of the hangar also contained PCBs at elevated concentrations. Due to the presence of PCBs and lead in Hangar 1 building materials, in 2002, NASA closed the hangar to all personnel except those involved in essential maintenance, abatement, or environmental cleanup activities and the Navy designated Hangar 1 as Installation Restoration (“IR”) Site 29.

In September 2003, NASA and the Navy implemented a Time Critical Removal Action (“TCRA”) to remove sediments contaminated with PCBs from the storm water collection trench located around the perimeter of Hangar 1. Between September 2003 and February 2004, the Navy implemented a second TCRA to control the migration of PCBs from Hangar 1 to the storm drain system and the environment by coating the exterior siding of the Hangar with an asphalt emulsion; this TCRA was envisioned as a temporary measure until a more permanent solution could be implemented.

From 2010 to 2013, additional abatement was undertaken by the Navy in order to mitigate the known PCB contamination at Hangar 1. This included the removal of the siding and roofing,

deconstruction of interior structures, cleaning by high-pressure washing and preparation of steel and/or concrete surfaces, and application of an epoxy coating system (Carbomastic-15 or “CM15”) to the hangar’s remaining structural steel frame and certain concrete structures to encapsulate residual PCBs. The Navy subsequently prepared a Long-Term Management Plan (“LTMP”) that NASA was responsible for implementing. The abatement was undertaken by NASA and the Navy prior to leasing the site to Planetary Ventures in 2014, due to ongoing and significant environmental concerns. This phase was implemented at that time out of necessity prior to the identification of a new user and a new use for the Hangar. The removal of materials during abatement was therefore part of the first phase of the ongoing rehabilitation of Hangar 1, and not a permanent alteration.

Alterations

Hangar 1 has undergone several alterations over time including:

- Mooring circles and mooring mast removed sometime after the crash of the USS *Macon* in 1935 and the subsequent termination of the Lighter-Than-Air program
- Original personnel doors replaced, and additional doors added for various occupants and uses
- Interior configuration and finishes altered frequently since original construction to suit specific use requirements of changing military occupants
- Portions of concrete floor slab repaired and replaced, some tie-downs and portions of railroad tracks removed
- Gutters and downspouts added to windows to control water infiltration
- Black bitumen coating applied to mansard panels to address water infiltration; based on a review of historic photographs, this occurred sometime between 1964 and 1967
- Removal of steel-panel siding, windows, personnel doors, truck doors, and interior partitions and finishes during abatement program (2010-13)

Character-defining Features

Site and Setting

- North-South orientation adjacent to airfield
- Open viewshed of airfield
- Spatial relationship to adjacent Buildings 32 and 33
- Proximity and axial relationship to Shenandoah Plaza and historic district directly to the west
- Concrete paving and remaining metal tie-downs south of hangar
- Remnant rail tracks

Exterior

- Oblong plan and parabolic profile
- North and south rolling clamshell doors and associated equipment, tracks, and stops
- Concrete base walls
- Monitor walk at apex of roof

- Concrete apron and metal drainage grates around building perimeter
- Profiled steel panel cladding (removed 2010-13)
- Horizontal bands of steel-framed windows (removed 2010-13)
- Personnel, truck, and aviation doors (removed 2010-13)

Interior

- Configuration of central volume flanked by office and shop spaces and mezzanines/levels two and three
- Exposed steel structural system
- Cork room framing
- Catwalk framing
- Parabolic elevator and crane tracks
- Remaining steel stairs
- Remaining concrete floor slab, tracks, and tie-downs

Current condition photographs are included in Appendix G; select historic photographs are in Appendix H.

6.0 FINDING OF EFFECT

The Criteria of Adverse Effect pursuant to 36 C.F.R. 800.5(a)(1) were applied to assess effects of the Phase II Project on historic properties within the APE:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

To comply with Section 106, the criteria of adverse effect are applied to historic properties in the Undertaking's APE, pursuant to 36 CFR Section 800.5(a). A finding of no adverse effect may be appropriate when the undertaking's effects do not meet the threshold set forth in the criteria of adverse effect, or conditions are imposed to ensure review of rehabilitation plans for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (codified in 36 CFR Section 68). If a finding of adverse effect is made, mitigation is proposed and resolution of adverse effects occurs through consultation in accordance with 36 CFR Section 800.6(a) to avoid, minimize, or mitigate adverse effects on historic properties.

The Phase I and Phase II Projects are subject to NPS review and approval as part of the Federal Rehabilitation Tax Credit Certification Process. The Tax Credit Part 1 application was approved by the NPS on February 14, 2020. The Tax Credit Part 2 submittal is anticipated in May 2020. If the NPS determines that the Phase I and Phase II Projects meet the Secretary of the Interior's Standards for Rehabilitation and certifies the Part 2 application, then there would not be the potential for adverse effect as defined in 36 CFR Section 800.5.

Several examples of adverse effects are listed in 36 C.F.R. 800.5(a)(2). The following assessment examines the Undertaking under each of those examples, including an analysis of compliance with the Secretary of the Interior's Standards for Rehabilitation.

i. Physical destruction of or damage to all or part of the property

The Phase II Project would not damage or destroy any historic property. Any potential physical impacts to historic properties are considered in the discussion of the Phase II Project's compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties. Therefore, the Phase II Project would not cause an adverse effect under this criterion.

ii. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties (36 C.F.R. part 68) and applicable guidelines

With the SHPO's agreement, if a property is restored, rehabilitated, repaired, maintained, stabilized, remediated, or otherwise changed in accordance with the Standards, then it will not be considered an adverse effect.

The Secretary of the Interior's Standards for the Treatment of Historic Properties (the Standards) provide guidance for reviewing proposed projects that may affect historic resources. The Standards and associated guidelines address four distinct historic "treatments," including: (1) preservation; (2) rehabilitation; (3) restoration; and (4) reconstruction. The specific Standards and guidelines associated with each of these possible treatments are provided on the National Park Service's website regarding the treatment of historic resources.

The intent of the Standards is to assist the long-term preservation of a property's significance through the preservation, rehabilitation, and maintenance of historic materials and features. The Standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and interior of the buildings. The Standards also encompass related landscape features and the building's site and environment, as well as attached, adjacent, or related new construction.

The Standards for Rehabilitation (36 CFR 67) address the most prevalent treatment. "Rehabilitation" is defined as "the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values." As stated in the definition, the treatment "rehabilitation" assumes that at least some repair or alteration of the historic building will be needed in order to provide for an efficient contemporary use; however, these repairs and alterations must not damage or destroy materials, features, or finishes that are important in defining the building's historic character.

The following is an assessment of the Phase II Project for compliance with the Secretary of the Interior's Standards for Rehabilitation and the associated guidelines. The Phase II Project has been designed to conform with the period of significance of 1930-1935, based on the significance of Hangar 1 as the purpose-built home for the USS *Macon* as identified in the NAS Sunnyvale Historic District NRHP nomination.

Design details are shown in Appendix B; renderings of the proposed Project are in Appendix C.

Standard 1: A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces and spatial relationships.

The Phase II Project involves the exterior re-cladding, seismic strengthening, and core interior improvements of Hangar 1 for potential future tenant uses involving research and development,

including testing and light assembly uses related to space, aviation, rover/robotics, and other emerging technologies. These potential uses will require minimal changes to the existing exterior and interior features of Hangar 1, and will require re-installation of exterior cladding and windows. At the exterior, the non-extant abated profiled steel panel siding and windows will be replaced with compatible new profiled metal panel siding and windows that recreate the appearance of the original features and materials; and the glazed area at the third tier of windows on the east façade will be enlarged to admit more daylight and increase temperatures inside the hangar, to prevent a recurrence of the previous condensation issues. The expanded glazing will be screened by an architectural metal louver system designed to visually integrate the enlarged glazed opening with the surrounding profiled metal panels and so will be minimally visible from the exterior. See Appendix B, pages 18-23.

The interior of Hangar 1 will remain an open central volume with exposed steel structural framing and concrete floors, flanked by office and utility rooms under the mezzanine/level two. The existing toilet and electrical rooms have been altered and added over years of use and are not character-defining. They are structurally unsound and will be removed. New cores with toilet rooms, electrical rooms, telecommunications and mechanical rooms will be constructed at multiple locations along the east and west sides of the building, similar to the configuration of the existing rooms and their spatial relationship to the central interior volume. The central interior space and significant interior spatial relationships of Hangar 1 will remain intact.

Similarly, the existing metal stair systems vary in their construction methods, and many were likely added or altered over time. They are not compliant with current code requirements for headroom clearance, landings or railings. These stairs will be reconfigured to provide required clearances and railings, using similar concrete and metal fabrications in similar locations as the originals. Other utility stairs serving original upper decks and mezzanine/level two will be removed in their entirety as they are no longer functionally required. Since these stairs have been altered and added over time, their reconfiguration or removal will not impact the historic character of Hangar 1.

Buildings 32 and 33 will be retained in place. Although they will not be rehabilitated for new use, they will be repaired to prevent water intrusion and deterioration. Their distinctive materials, features, spaces, and spatial relationships will not be altered.

The Phase II Project meets Standard 1.

Standard 2: The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces and spatial relationships that characterize a property will be avoided.

The Phase II Project will retain and preserve the extant historic character of Hangar 1 and will enhance it by replacing the abated metal panel siding with compatible new siding, and windows and doors that recreate the visual effect of the originals. Distinctive materials, features, spaces and spatial

relationships that characterize Hangar 1 will be retained and repaired, including its oblong plan, surrounding concrete apron and metal drainage grates, parabolic profile, rooftop monitor walk, steel structural frame, battered concrete stem wall, clamshell doors, historic window and door openings, interior configuration of central volume flanked by office and utility spaces and mezzanines/levels two and three, exposed steel structural system, and catwalks. Hangar 1 will maintain its spatial relationships to Shenandoah Plaza on the west; and the airfield, Buildings 32 and 33, and Hangars 2 and 3 on the east. See Appendix C for a comparison between historic photographs and renderings of the proposed Project, which illustrate that Hangar 1 will retain its historic character.

Buildings 32 and 33 will be retained in place and repaired to prevent water intrusion and further deterioration. Their historic materials and features, and their spatial relationship to Hangar 1, will not be altered.

The Phase II Project meets Standard 2.

Standard 3: Each property will be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.

The Undertaking does not propose any changes to Hangar 1 that would create a false sense of historical development. No conjectural features or elements from other historic properties will be added. The new exterior cladding will be in two distinct profiles that reproduce, as closely as possible, the overall visual characteristics of the original cladding, while providing improvements necessary for occupancy and maintenance; and the new windows will match the original window systems in configuration, details and shadow lines to create the same visual characteristics, but improved with thermal breaks and insulated glazing. The Phase II Project meets Standard 3.

Standard 4: Changes to a property that have acquired historic significance in their own right will be retained and preserved.

Hangar 1 has undergone several alterations over time including replacement of the personnel doors, addition of new doors, repeated alteration and reconfiguration of the interior to accommodate the specific use requirements of changing military and other occupants, and the application of a black bitumen coating to the mansard panels to address water infiltration. None of these changes have acquired significance over time and do not contribute to the historical character of Hangar 1. The Phase II Project meets Standard 4.

Standard 5: Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

Hangar 1 is significant under Criterion C for its distinctive parabolic steel truss construction, one of the great engineering achievements of the early twentieth century. The Phase II Project will preserve

the building's steel structural frame, including the trusses supported on rigid A-frames, x-bracing, clamshell doors, mezzanines/levels two and three, and catwalks, and will reinforce them as necessary to seismically upgrade the building. Deficient members constitute a small minority of the total number of members in the building's structural frame. They will be strengthened by attaching additional members of similar sizes and profiles, to maintain the overall visual effect of the Hangar's exposed structural frame. The frame will remain exposed and visible on the building's interior, as it was historically.

The building's distinctive clamshell doors and their operating machinery will be retained and re-clad. The south door will be repaired and returned to operable condition; the north door will be fixed in the closed position, but the operational machinery will be left in place so that the door may be returned to operable condition in the future.

The surviving elements of the historic elevator track and pit, metal girder brackets for the rail hoist system, and Cork Room framing will be retained in place. The battered concrete stem wall around the building's perimeter will be retained and repaired, if possible; if there are areas where repair is not feasible, the stem wall will be reconstructed in those locations to match the original in size, shape, design, configuration, materials, and finish. The floor will be patched and repaired as necessary to provide a safe, level surface, but the surviving remnants of the historic concrete floor, tracks, and tie-downs will be preserved.

Buildings 32 and 33 will be retained in place and repaired to prevent moisture intrusion and further deterioration. Their distinctive form, double-hung windows, and plaster finish will be retained and repaired.

The Phase II Project meets Standard 5.

Standard 6: Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

Hangar 1's deteriorated historic panel siding, steel windows, and doors were leaking toxins including asbestos, lead, and polychlorinated biphenyls (PCBs) into NASA's stormwater settling basin and retention ponds and therefore were removed as part of the Navy's 2010-13 abatement program, in anticipation of the building's future rehabilitation. The Phase II Project will replace these features with new compatible siding, windows, and doors that match the old as closely as possible in design, color, texture and, where possible, materials.

The new exterior siding will consist of profiled metal panels in silver aluminum color, to match the appearance of the original metallic aluminum paint. The panels will have two profiles, as did the originals. The lower panels will have a V-shaped trapezoidal profile that matches the shape and

profile of the original V-beam siding. The upper mansard panels will be a standing seam product with the seam size and spacing recalling the beaded profile of the original pencil-rib mansard panels. The new mansard cladding will have an overall visual effect that is similar to the original but will provide better thermal performance and waterproofing. The added layer of insulation under the panels will increase the thickness of the siding, compared to the original; but the few added inches will be imperceptible in proportion to the vast size of Hangar 1. The original planar inter-relationships of the materials, and their distinctive shadow lines, will be re-created.

In lieu of recreating the original built-up roofing system, a new membrane roofing system will cover the crown of the roof. This change will not be visible from any angle when viewed from grade, and will result in greater moisture resistance, less maintenance, and greater longevity as a roofing system. The existing monitor walk at the apex of the roof will be retained and rehabilitated; non-combustible metal deck will be installed in lieu of recreating the original wood planking; and there will be modified guard rails to meet current safety codes. These minor modifications are required to meet current codes and will not be visible from any angle when viewed from grade.

The historic windows that were removed as part of the 2010-13 abatement cannot be replicated. Due to their design and construction, the original windows were not sufficiently watertight; therefore, new, compatible windows will be installed. The new windows will be in the original openings, with aluminum, rather than steel, frames and new insulated glazing. The new windows will be organized in four tiers, each with a distinct design that matches the sizes, proportions, locations, configuration, light pattern, profiles, glazing types, and details of the historic windows as closely as possible. The new window systems have been carefully designed with adequate sealants and flashing, thermal breaks, and insulated glazing to avoid the performance issues of the original windows, while still matching the historic details and configuration to recreate the same visual characteristics and shadow lines as the originals.

The original personnel, aviation, and truck doors that were removed as part of the 2010-13 abatement will be replaced with compatible new glazed aluminum doors in the original locations. Sizes of the new doors may be altered slightly to conform to functional needs and accessibility requirements, but the doors will achieve a similar overall visual effect as the originals.

The clamshell doors will be retained and rehabilitated. The south doors will be repaired and returned to operating condition. The north doors will be fixed in the closed position, but the operating machinery will be left in place so that the doors may be returned to operating condition in the future.

The existing concrete stem wall at the perimeter of the building is in fair condition. It will be retained and repaired; in areas where repair is not possible, those portions of the wall will be replaced with a new concrete stem wall that matches the original in design, profile, dimensions, material and finish, if the existing is deteriorated beyond repair.

SECTION 106 TECHNICAL REPORT - HANGAR 1: PHASE II REHABILITATION

Any original exterior lighting was minimal and utilitarian and is no longer extant. New exterior lighting will be provided to illuminate building entrances, for safety and maintenance, and to aesthetically highlight the building exterior. New lighting fixtures will be simple, utilitarian fixtures compatible with the historic industrial character of Hangar 1. The new aesthetic lighting will provide a wash over the building skin and will not materially impact Hangar 1. The wash will be restricted to the building surface and will not spill over into Shenandoah Plaza or the airfield.

The Project proposes a new interior lighting system to replace the interior lighting that was removed as part of the 2010-13 abatement. The new layout will recall, but will not recreate, the historic layout. The historic fixtures were positioned out of reach of the catwalks; replicating these locations would make regular maintenance extremely difficult. The new layout will shift the fixture locations as needed to locate them within reach of the catwalks but will recall the regularly spaced grid pattern extended over the entire surface of the parabolic vault that characterized the historic layout. The new fixtures will be contemporary fixtures that are similar in size, character, and design to the originals.

Buildings 32 and 33 will be retained in place and repaired to prevent moisture intrusion and further deterioration. If any historic materials are deteriorated to the extent that repair is not feasible, those materials will be replaced in-kind.

The Phase II Project meets Standard 6.

Standard 7: Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

The Phase II Project does not propose any chemical or physical treatments that would cause damage to historic materials. The Phase II Project meets Standard 7.

Standard 8: Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

The Phase II Project proposes limited ground disturbance, as needed, to install new exterior lighting, bury conduit and other utilities, remove pavement for new water and fire mains, connect new sewer laterals to sewer mains, add shallow spread footings at new steel posts, and subgrade preparation beneath new interior slab. There are no known archaeological resources within the Phase II Project footprint. A small portion of the Project site boundary is adjacent to areas that were identified as having heightened sensitivity for historic-era archaeological resources (based on review of historic-era maps). There has been previous ground disturbance in this portion of the APE, and the Project has been designed to contain excavation, to the extent possible, to areas that are outside of the areas of sensitivity. However, in the event of discovery of unknown subsurface archaeological resources, NASA would follow its standard operating procedures for unanticipated discoveries consistent with 36 CFR 800.13 as outlined in the Integrated Cultural Resources Management Plan (AECOM 2014),

SECTION 106 TECHNICAL REPORT - HANGAR 1: PHASE II REHABILITATION

which would halt work in the vicinity of the discovery and engage a qualified archaeologist to evaluate the discovery and determine the need for mitigation or consultation with the SHPO.

The Phase II Project meets Standard 8.

Standard 9: New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

The Phase II Project does not propose any new additions to Hangar 1, or any related new construction. The exterior recladding and rehabilitation do propose some minor alterations. The glazed area at the third tier of windows on the east façade will be enlarged to admit more daylight and increase temperatures inside the Hangar in the morning, to prevent a recurrence of the previous condensation issues. The expanded glazing will be screened by an architectural metal louver system designed to visually integrate the enlarged glazed opening with the surrounding profiled metal panels and so will be minimally visible when viewed directly from the east; when viewed obliquely from the northeast or southeast, the expanded glazing will be virtually invisible. The expanded glazing will be limited to the east façade, facing the airfield; the west façade of Hangar 1, which faces Shenandoah Plaza and forms a prominent visual backdrop for the historic district, will retain its historic appearance. This is in keeping with the guidance provided by the National Park Service in the Guidelines for Rehabilitating Historic Buildings,¹¹ which recommends installing additional windows, if required by the new use, on rear or other non-character-defining elevations. The expanded glazing will be clearly differentiated from the pattern and detailing of the replacement windows.

In order to provide natural ventilation for future new interior uses in accordance with code requirements, louvers will be incorporated into the top row of lights of the Tier One windows. Implementing natural ventilation in lieu of mechanical ventilation allows for more flexibility for future development of the interior of the Hangar without the need for additional alterations to the façade. The louvers will replace the glazing in the top row of lights, but will maintain the historic proportions, patterns, and visual effect of the original windows.

The proposed lightning protection system will be minimally visible. Most of the system – the conductors and ground ring – will be located at the building interior and below grade. The rooftop masts will be tiny in scale compared to the vast size of Hangar 1 and, due to their position, will be minimally visible. The system will not alter historic features or materials and will protect the metal structure of Hangar 1 from lightning strikes.

¹¹ U.S. Department of the Interior, National Park Service, Technical Preservation Services, “The Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings,” as revised 2017.

The existing toilet and electrical rooms have been altered and added over years of use and are not character-defining. They are structurally unsound and will be removed. New cores with toilet rooms, electrical rooms, telecommunications and mechanical rooms will be constructed at multiple locations along the east and west sides of the building, similar to the configuration of the existing rooms and their spatial relationship to the central interior volume. The new cores will be simple, free-standing, utilitarian concrete structures that will be compatible with the industrial character of Hangar 1.

Similarly, the existing metal stair systems vary in their construction methods, and many were likely added or altered over time. They are not compliant with current code requirements for headroom clearance, landings or railings. These stairs will be reconfigured to provide required clearances and railings, using similar concrete and metal fabrications in similar locations as the originals. They will be compatible with the historic, utilitarian character of Hangar 1.

The Phase II Project meets Standard 9.

Standard 10: New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The Phase II Project does not propose new additions to Hangar 1 or related new construction. Therefore, Standard 10 does not apply.

Summary

In summary, the proposed rehabilitation and adaptive reuse of Hangar 1 meets the Secretary of the Interior's Standards for Rehabilitation. After completion of the Phase II Project, Hangar 1 and Buildings 32 and 33 will remain contributors to the NAS Sunnyvale Historic District, and Hangar 1 will remain individually eligible for listing in the NRHP. Therefore, the Phase II Project would not cause an adverse effect under this criterion.

iii. Removal of the property from its historic location

The Phase II Project would not remove a historic property from its historic location. Therefore, the Phase II Project would not cause an adverse effect under this criterion.

iv. Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance

Although the specific future use of Hangar 1 has not been determined, it would be used for a program type that would be complementary to its historic significance. The central volume of the Hangar would be left open for potential future tenant uses involving research and development, including testing and light assembly uses related to space, aviation, rover/robotics, and other emerging technologies. Buildings 32 and 33 are not proposed for a new use, and the proposed work is confined to exterior maintenance and repair. The setting of Hangar 1, adjacent Buildings 32 and

33, and the NAS Sunnyvale Historic District as a whole would remain the same. Therefore, the Phase II Project would not cause an adverse effect under this criterion.

v. Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features

No visual, atmospheric, or audible elements would be introduced by this Project that would diminish the integrity of Hangar 1, Buildings 32 and 33, or the NAS Sunnyvale Historic District. The future use of Hangar 1 would be in keeping with the research and development tradition of the NASA Ames Research Park and is not expected to introduce any additional visual, atmospheric, or audible elements that would impact the integrity of Hangar 1, the adjacent buildings, or the NAS Sunnyvale Historic District. The proposed new exterior aesthetic lighting will wash the exterior surface of Hangar 1 but will not spill over into Shenandoah Plaza or the airfield. The new lighting will not materially impact Hangar 1 or the district and will not impact the operation of the airfield. Therefore, the Phase II Project would not cause an adverse effect under this criterion.

vi. Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization

The Phase II Project will not involve the neglect of a property that causes its deterioration and therefore will not cause an adverse effect under this criterion.

vii. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance

The Phase II Project does not involve the transfer, lease, or sale of property out of Federal ownership or control. Therefore, the Phase II Project would not cause an adverse effect under this criterion.

7.0 CONCLUSION

The Undertaking to rehabilitate Hangar 1 and maintain Buildings 32 and 33 is intended to retain and preserve the significant character-defining features of each building and complies with the Secretary of the Interior's Standards for Rehabilitation. The criteria of adverse effect were applied to historic properties in the APE, including Hangar 1, Buildings 32 and 33, the NAS Sunnyvale Historic District, and unanticipated archaeological historic properties that may be present in the APE. The proposed Undertaking would not alter, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP. Therefore, a finding of No Adverse Effect per 36 CFR § 800.5(b) would be appropriate for this Undertaking.

8.0 REFERENCES

- AECOM. 2013. Historic Property Survey Report for the Airfield at NASA Ames Research Center, Moffett Field, California. On file at ARC.
- AECOM. 2014. Draft Integrated Cultural Resources Management Plan. On file at ARC.
- AECOM. 2017. NASA Ames Research Center Archaeological Resources Study. On file at ARC.
- CH2MHill. 2011. Condition Assessment and Rehabilitation Plan Hangar One. On file at ARC.
- EKI Environment & Water, Inc. 2019. Draft Final Hangar 1 Engineering Evaluation/Cost Analysis.
- NPS (National Park Service). 2017 (revised). The Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings.
- NRHP (National Register of Historic Places). 1994. National Register of Historic Places, U.S. Naval Air Station Sunnyvale, California Historic District, Moffett Field, Santa Clara County, California, NR #94000045.

The following content was redacted from this public posting:

Appendix A: Select Project Drawings

Appendix B

Design Details

Hangar 1 Rehabilitation Project Appendix B - Design Details

May 13, 2020



Appendix B -- Design Details

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01 Rehabilitation Approach and Goals

02 Exterior Reclad Approach, Shenandoah Plaza

03 Exterior Reclad Approach, Airfield

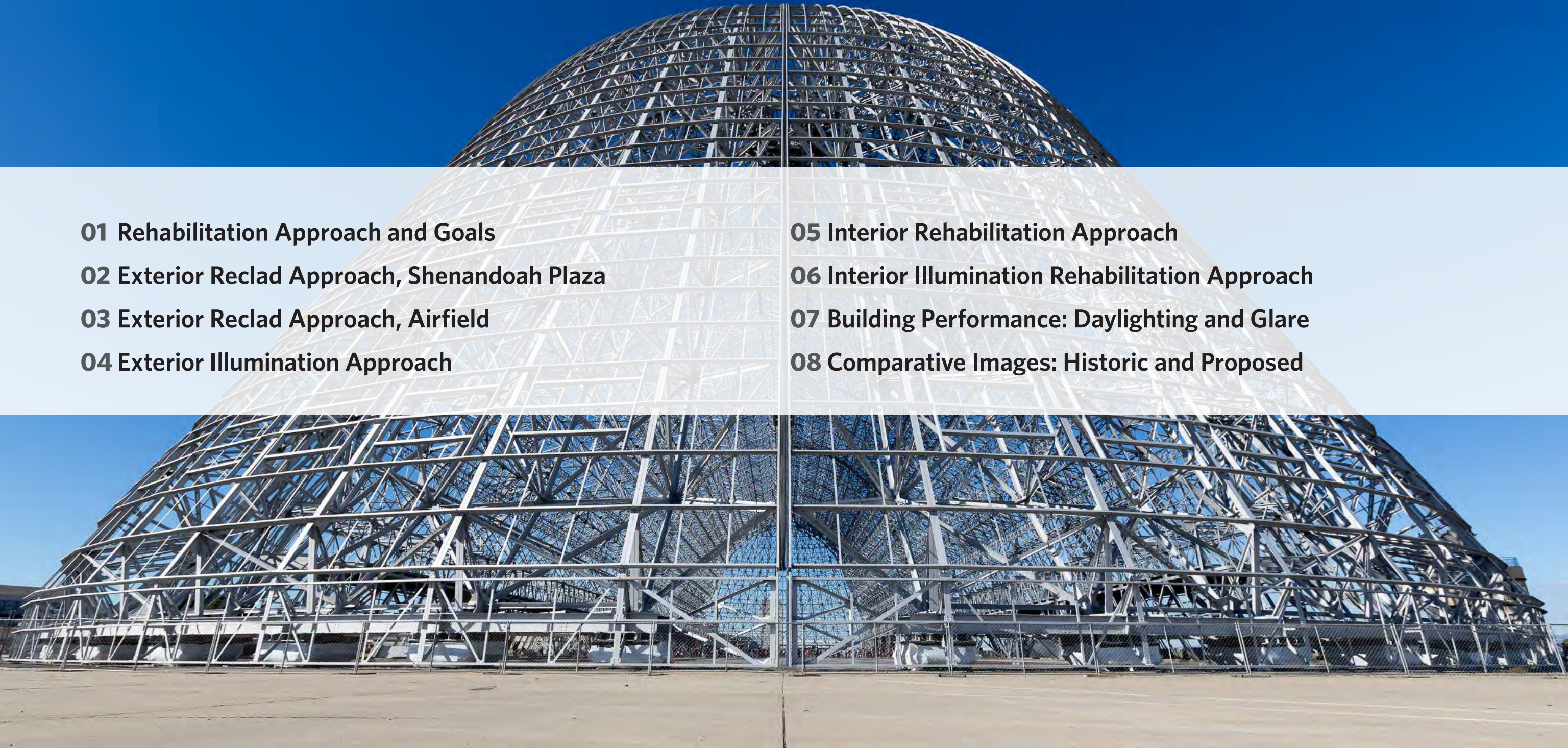
04 Exterior Illumination Approach

05 Interior Rehabilitation Approach

06 Interior Illumination Rehabilitation Approach

07 Building Performance: Daylighting and Glare

08 Comparative Images: Historic and Proposed



Hangar 1 Rehabilitation Approach and Goals

Original Hangar 1 Cladding Attributes

Built-up Roof:
Dark gray,
smooth

**Roof Monitor
Walk, Roof Vent:**
Low-profile metal
enclosure

Mansard:
Lightly textured, scale
slightly larger than
adjacent V-Beam panel;
dull aluminum finish

V-Beam Wall:
Taut, metallic, uniform
panel system,
"Dull Aluminum" finish

Stacked Strip Windows:
Top-tiers: textured panel,
vertical expression
Bottom-Tiers: flat panel,
horizontal expression

The Project will replicate, as closely as possible,
the overall visual characteristics of the original cladding

Original Hangar 1 Performance Deficiencies for Potential Future Tenant Uses

Thermal performance and condensation:
Uninsulated roof systems

Occupant experience:
High solar heat gain @ West windows

Ventilation openings:
insufficient for primarily human occupation

Water air permeability:
BUR and Mansard Roof

Interior Illumination:
Low daylighting level and point glare

Thermal:
Consistently low temps, especially in mornings

Acoustics:
High transmission from exterior / high reverberation at interior

Performance deficiencies of original systems whose replication would risk damage to historic fabric, and impede operational capability sufficient for potential future tenant uses

Hangar 1 Performance Improvements for Potential Future Tenant Uses

Thermal and condensation:
Roof insulation

Occupant experience:
Insulated or coated glazing panels

Ventilation openings:
Intake and exhaust at roof, at existing window openings

Water air permeability:
Membrane roofing over steel decking

Built to purpose low slope roofing system

Occupant experience:
More and better-distributed daylighting

Thermal:
Larger window openings, targeted morning solar heat gain

Acoustics:
Improved facade performance

Performance improvements including adequate waterproofing, tempered interior, and daylighting to help conserve historic fabric, and to improve interior environment for potential future tenant uses

Hangar 1 Exterior Reclad Approach, Shenandoah Plaza

Historic Image: Shenandoah Plaza



Proposed View from Shenandoah Plaza



The original fenestration pattern will be retained, and window openings will remain in their original locations and sizes

Proposed View from Shenandoah Plaza

The original fenestration pattern will be retained, and window openings will remain in their original locations and sizes



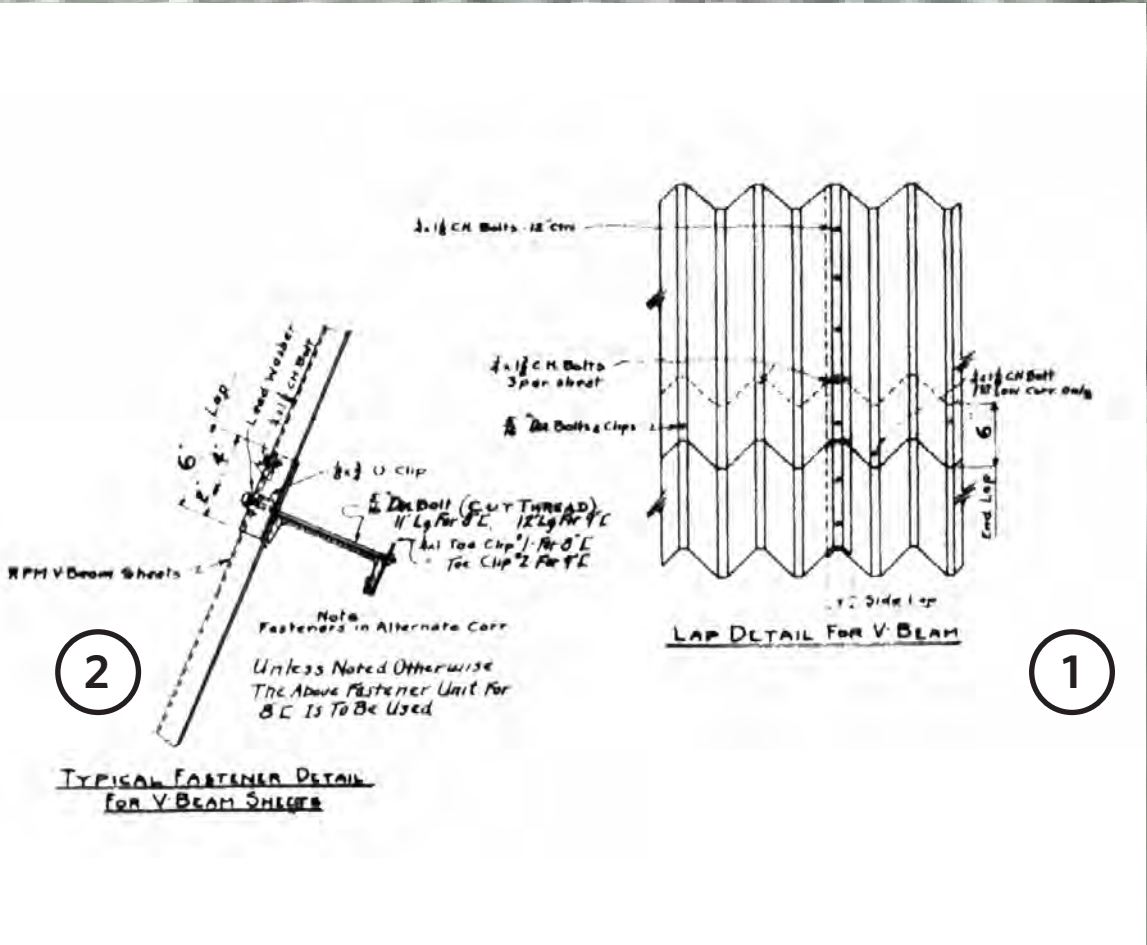
Typical Original Metal V-Beam Wall Siding Details

Typical Original V-Beam
Horizontal Joint

1

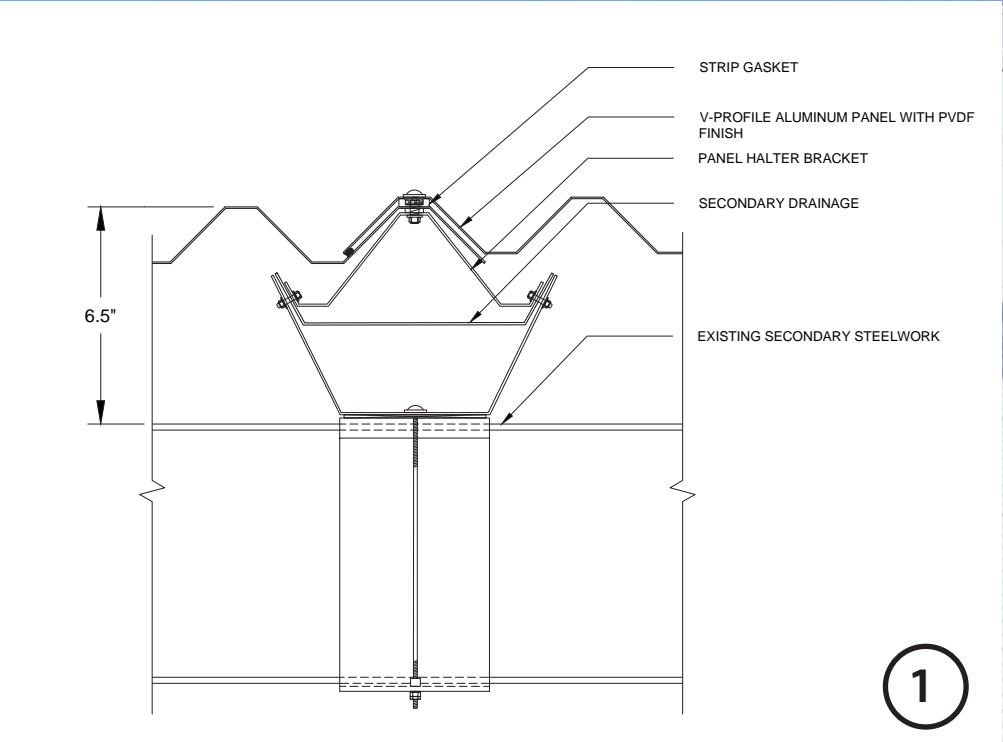
Typical Original
V-Beam Vertical Joint

2

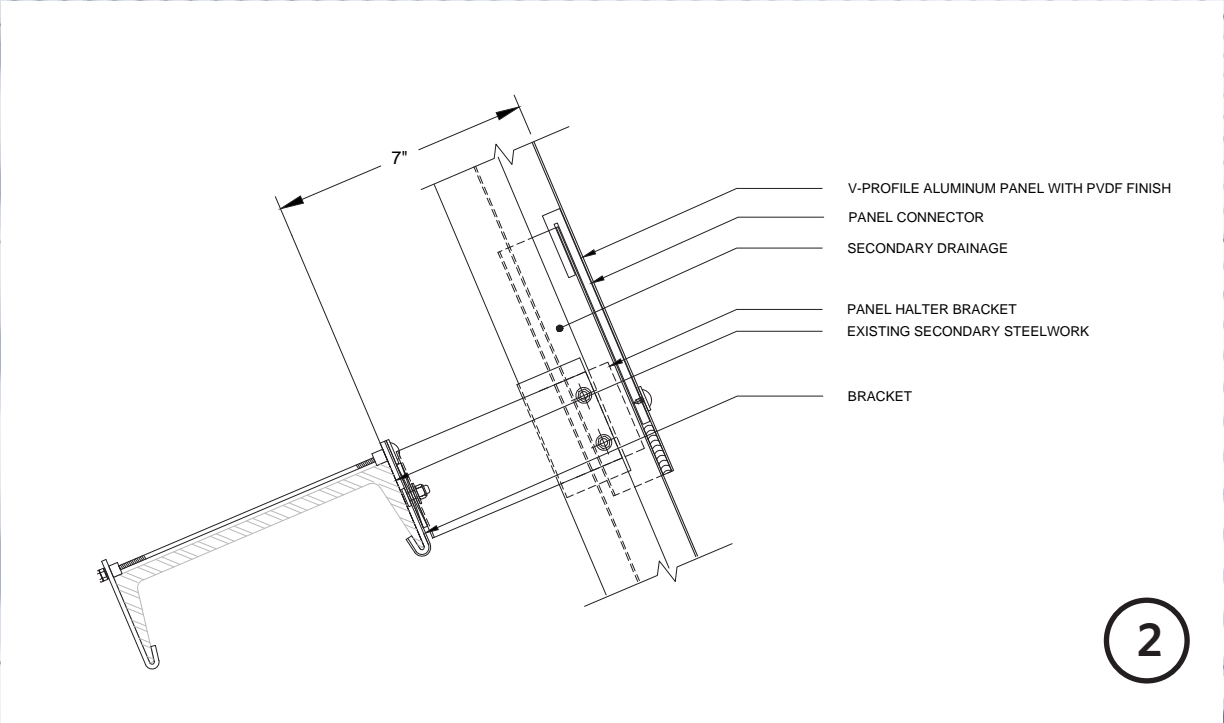


Proposed Typical Metal V-Beam Wall Siding Details

Typical Original V-Beam
Horizontal Joint ①



Typical Original
V-Beam Vertical Joint ②

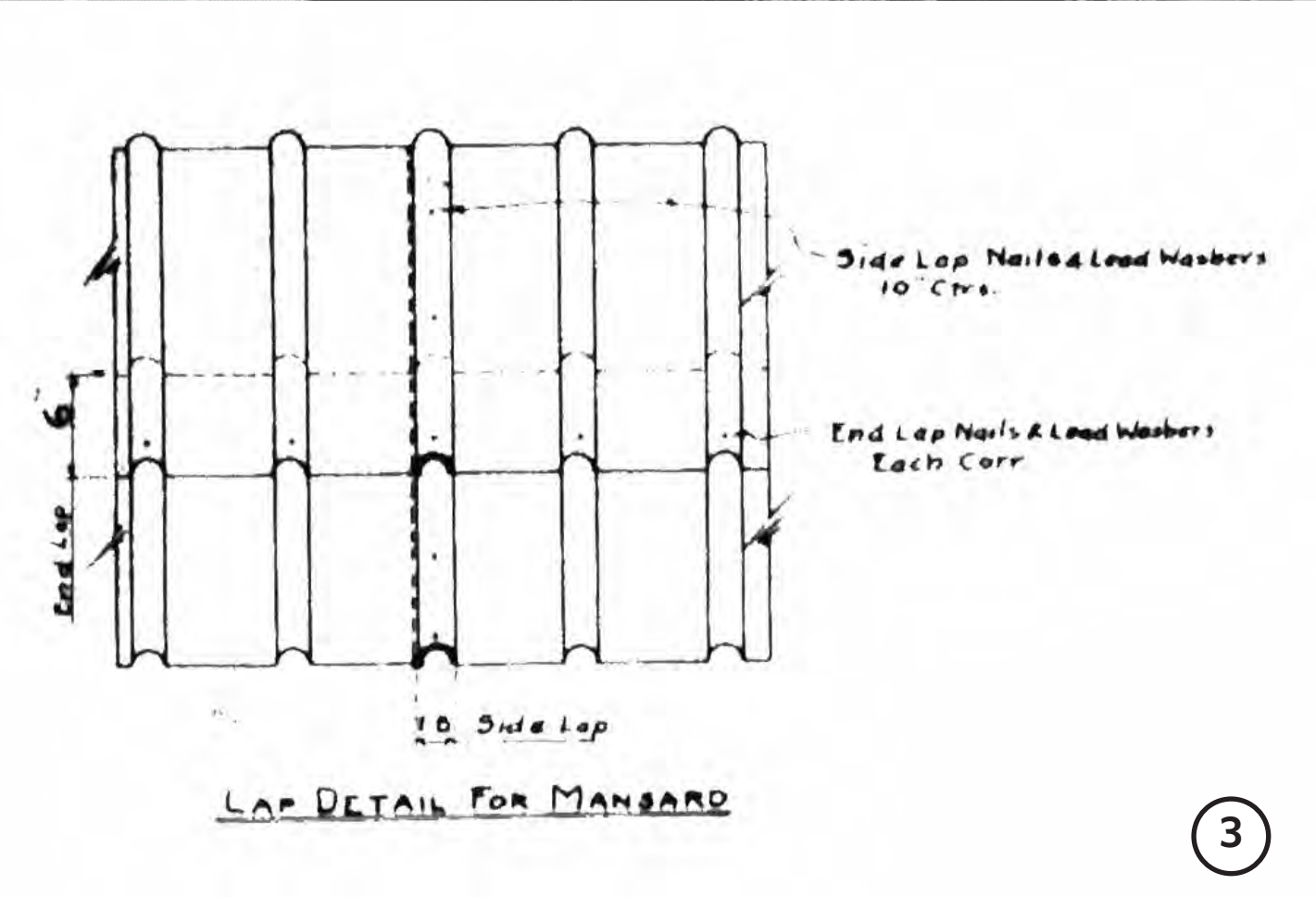


The new aluminum wall siding will retain the shape and profile of the original

Original Mansard Siding Details

Original
Typical
Mansard
Detail

3

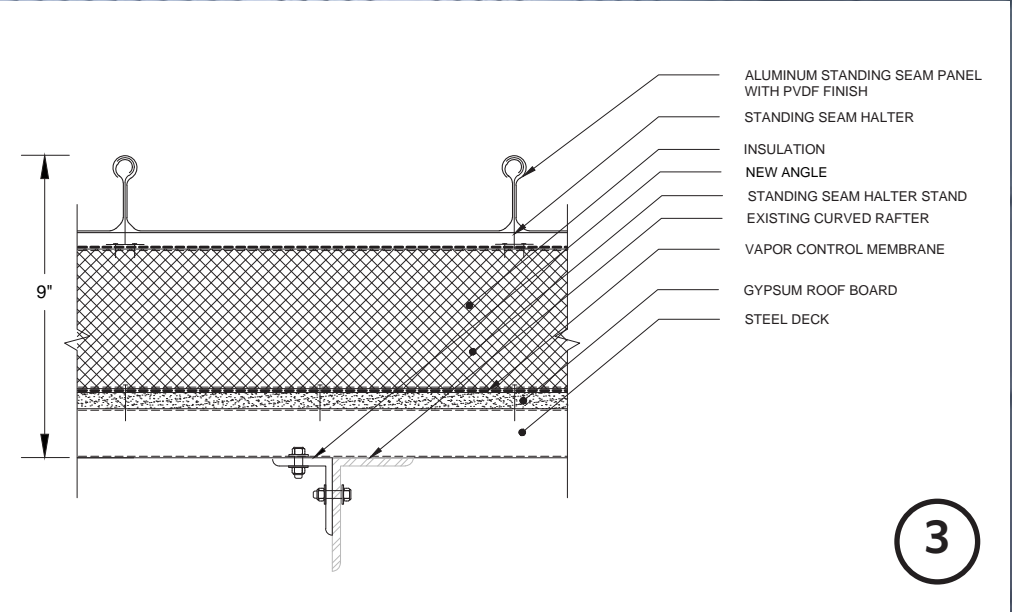


Proposed Typical Mansard Siding Details

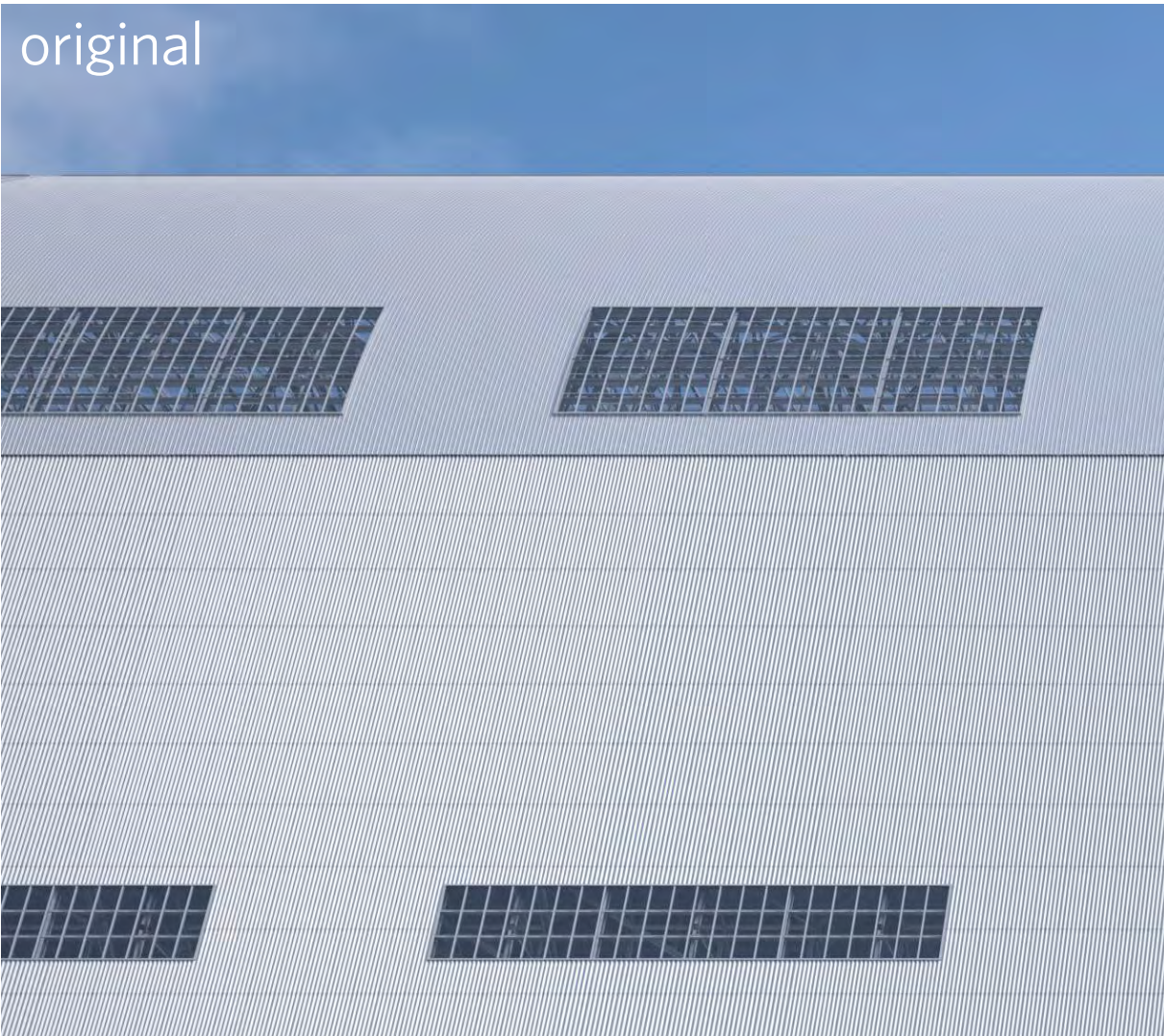
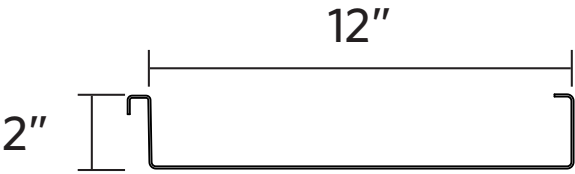
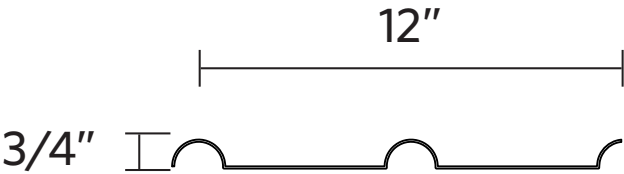
Proposed Typical Mansard Detail

3

New Mansard siding will be a sheet standing seam product with the seam size and spacing reflecting a similar character to the original with a smooth surface and regular pattern of seams

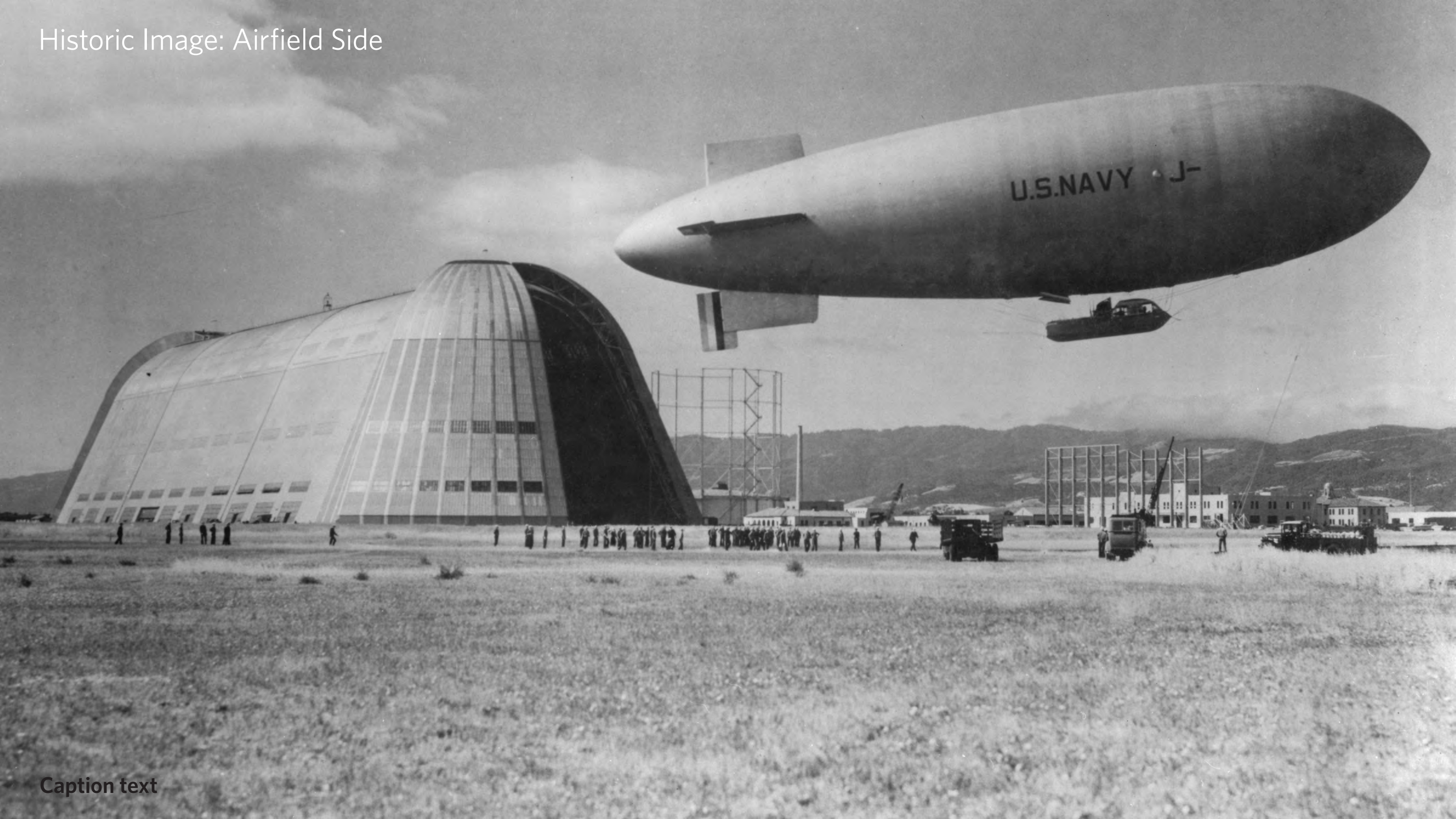


Comparison of Original and Proposed Mansard Siding Profiles



Hangar 1 Exterior Reclad Approach, Airfield

Historic Image: Airfield Side



Caption text

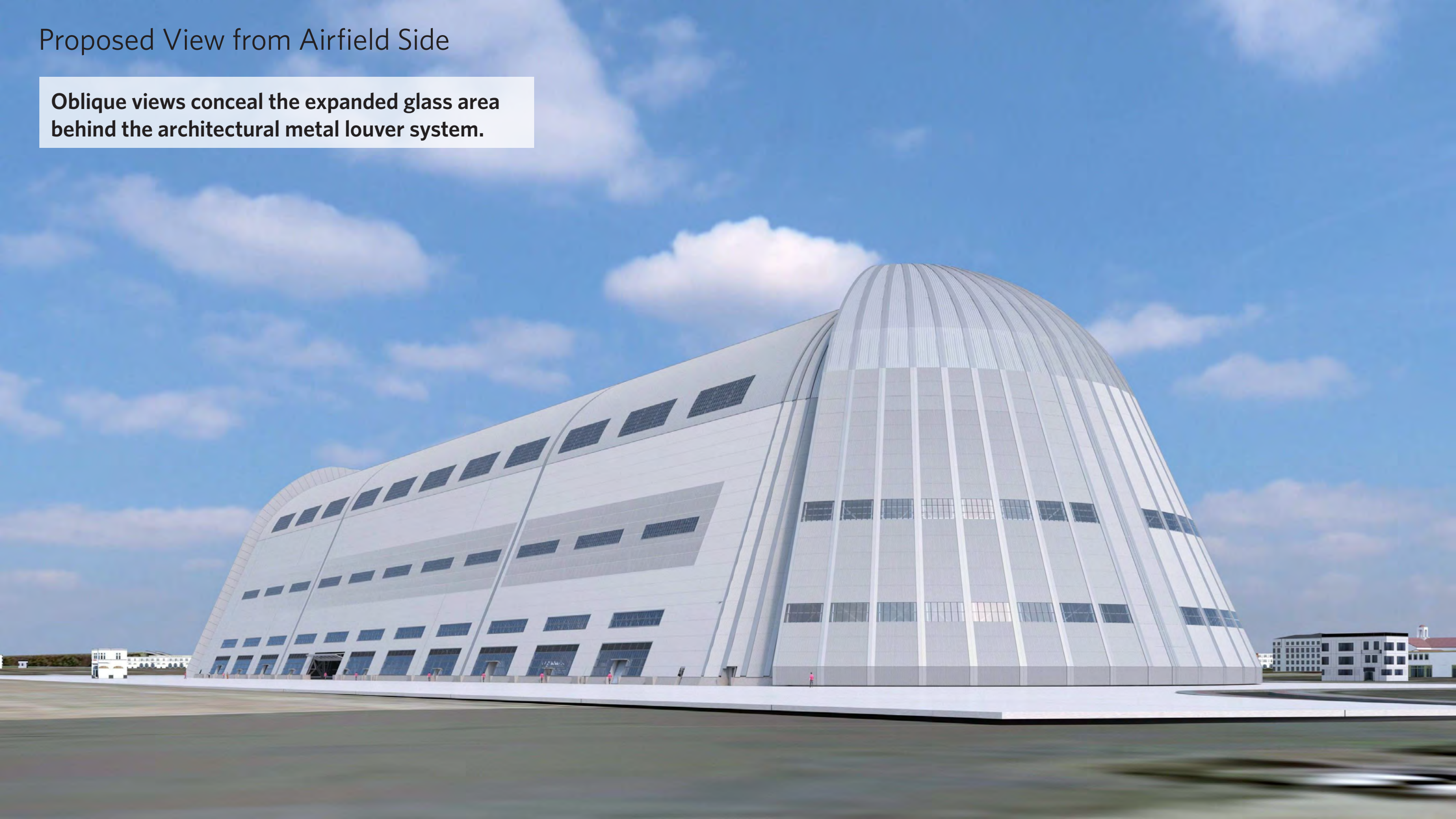
Proposed View from Airfield Side

Airfield side historic window openings will be retained within an expanded glass area behind an architectural metal louver system designed to visually integrate the enlarged glazed opening with the surrounding profiled metal panels in order to minimize visual impact, and which becomes less visible as the view becomes more oblique



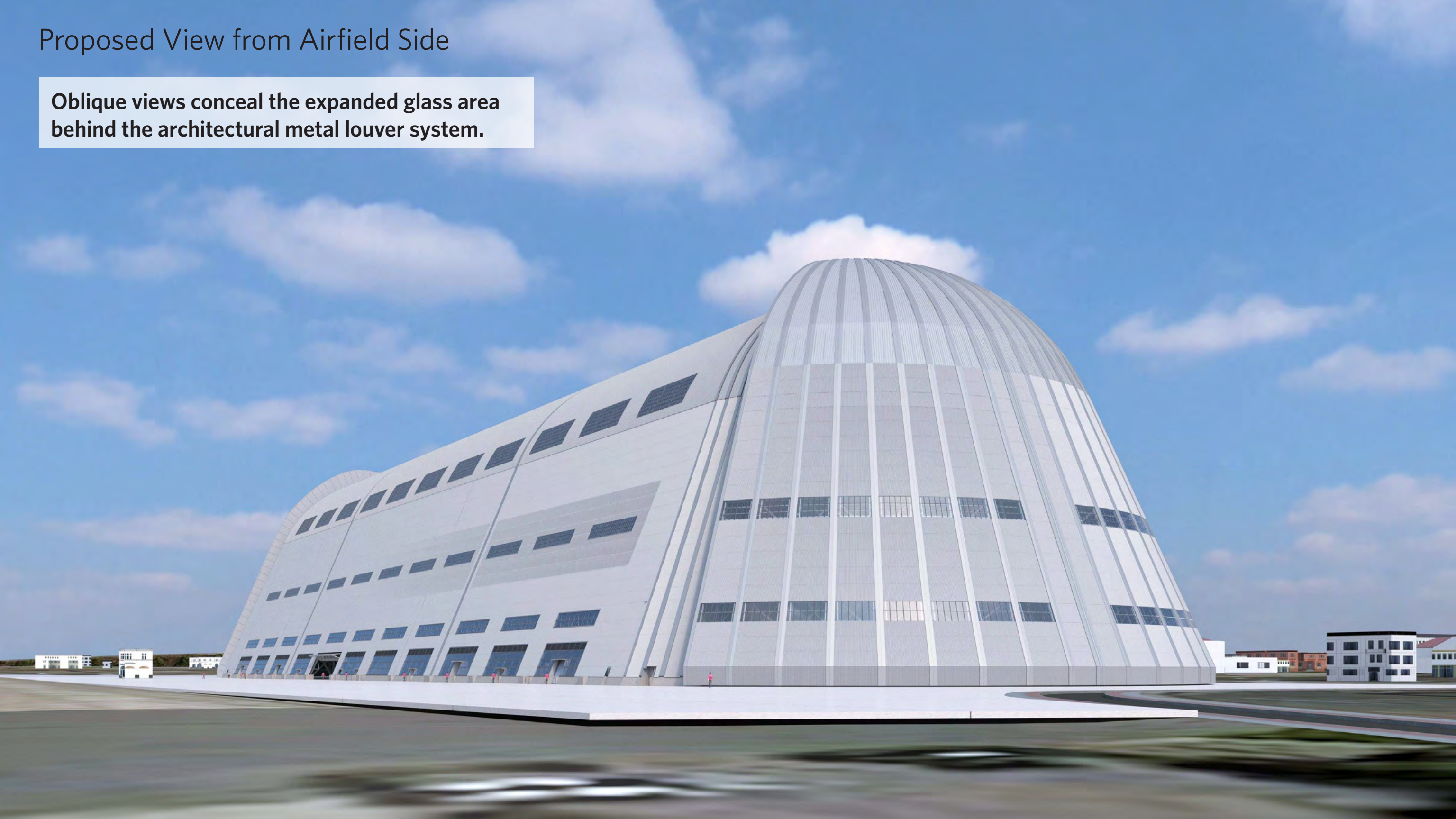
Proposed View from Airfield Side

Oblique views conceal the expanded glass area behind the architectural metal louver system.



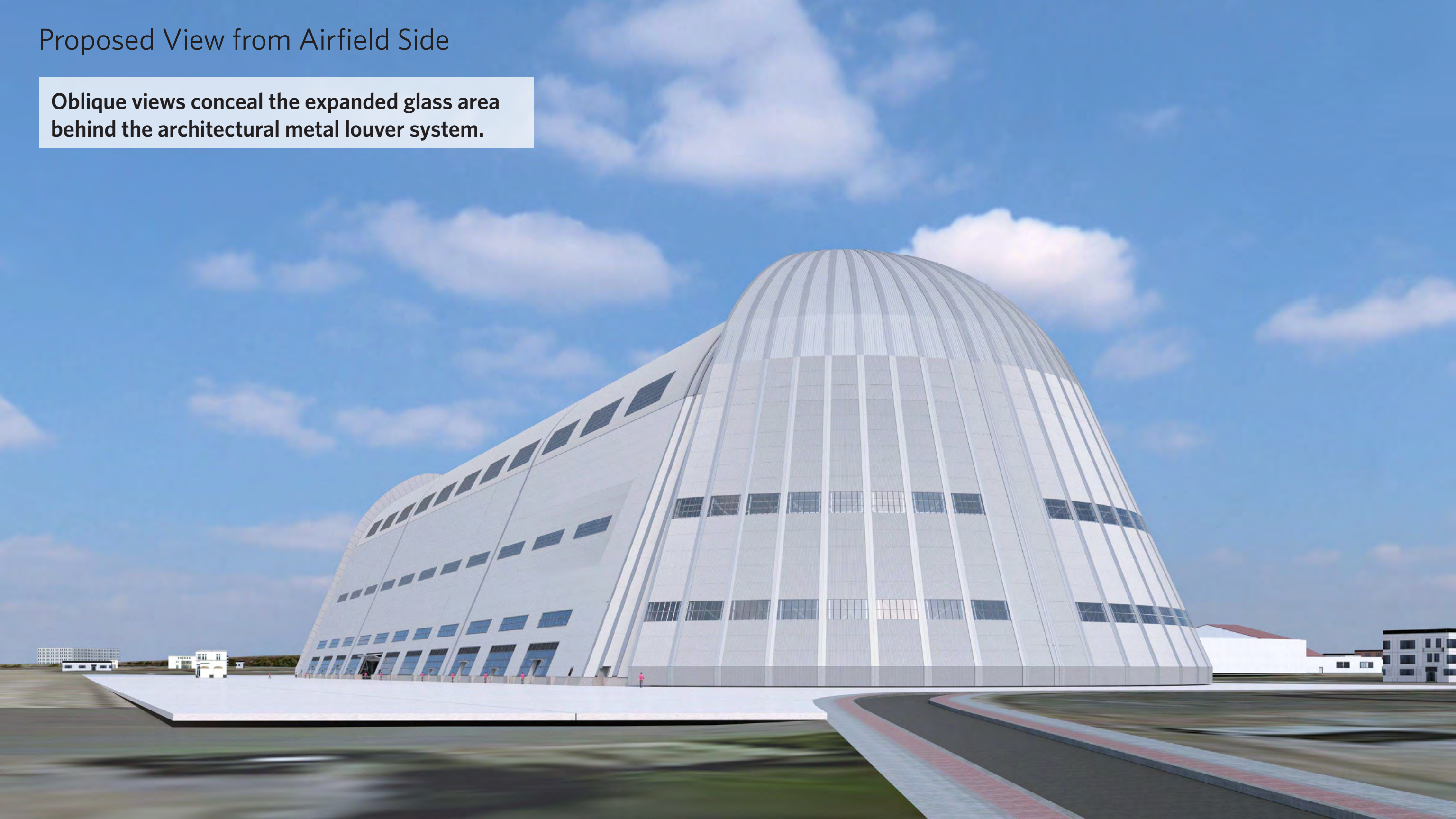
Proposed View from Airfield Side

Oblique views conceal the expanded glass area behind the architectural metal louver system.

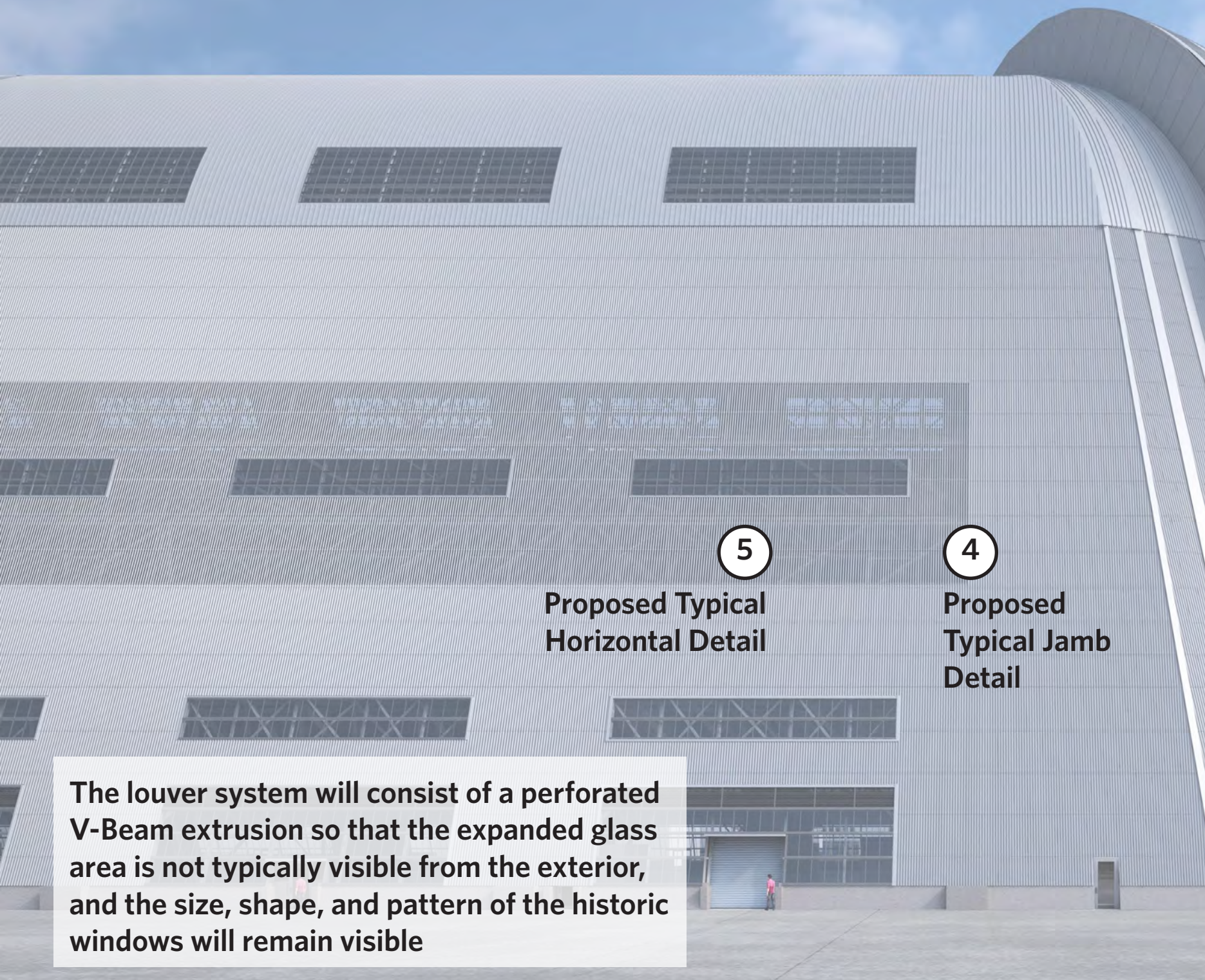


Proposed View from Airfield Side

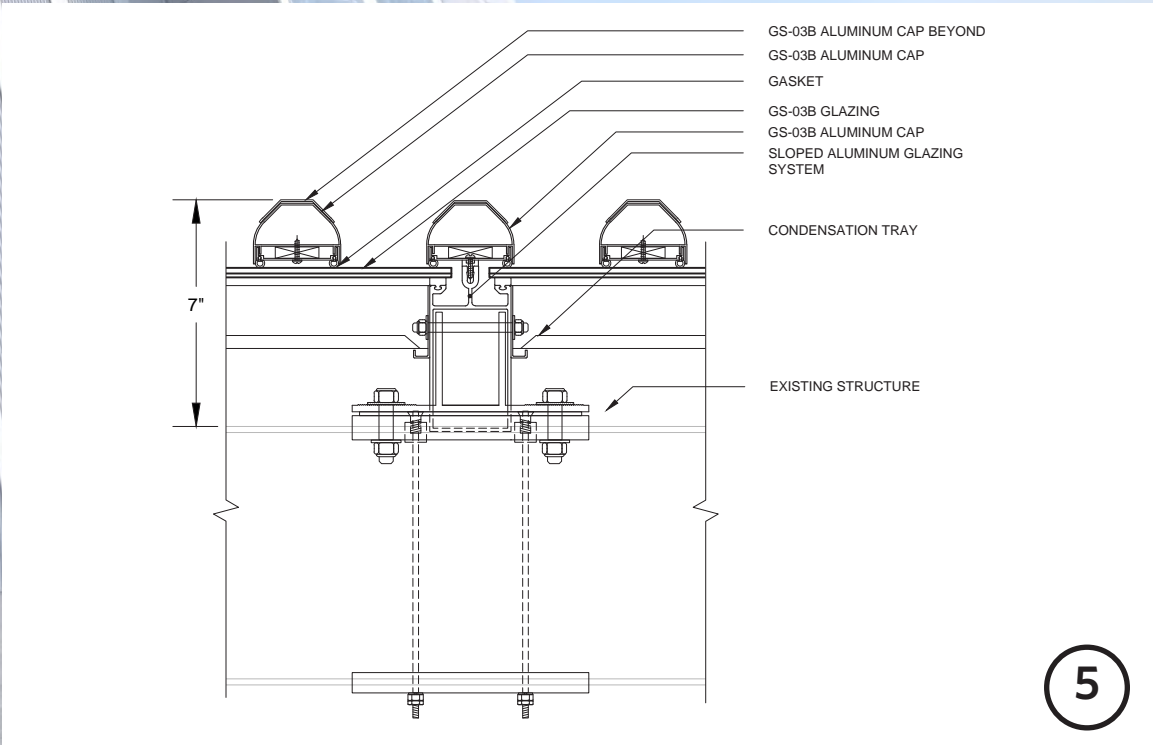
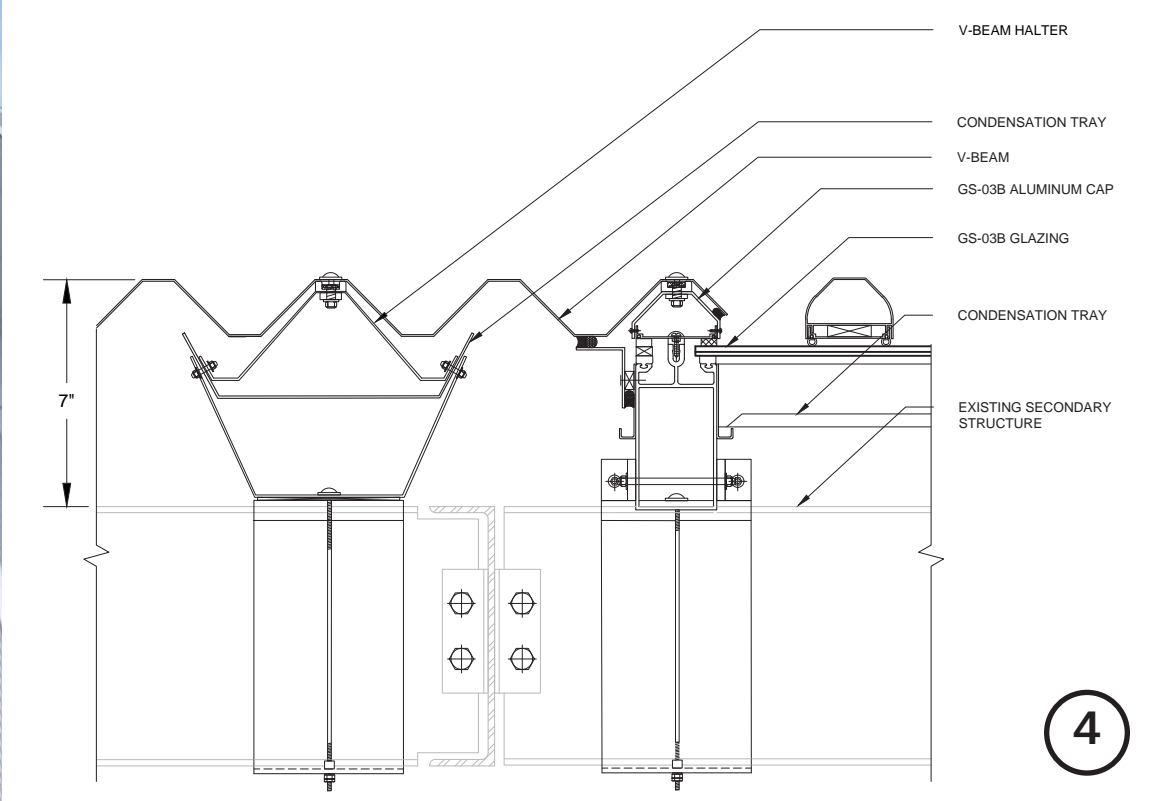
Oblique views conceal the expanded glass area behind the architectural metal louver system.



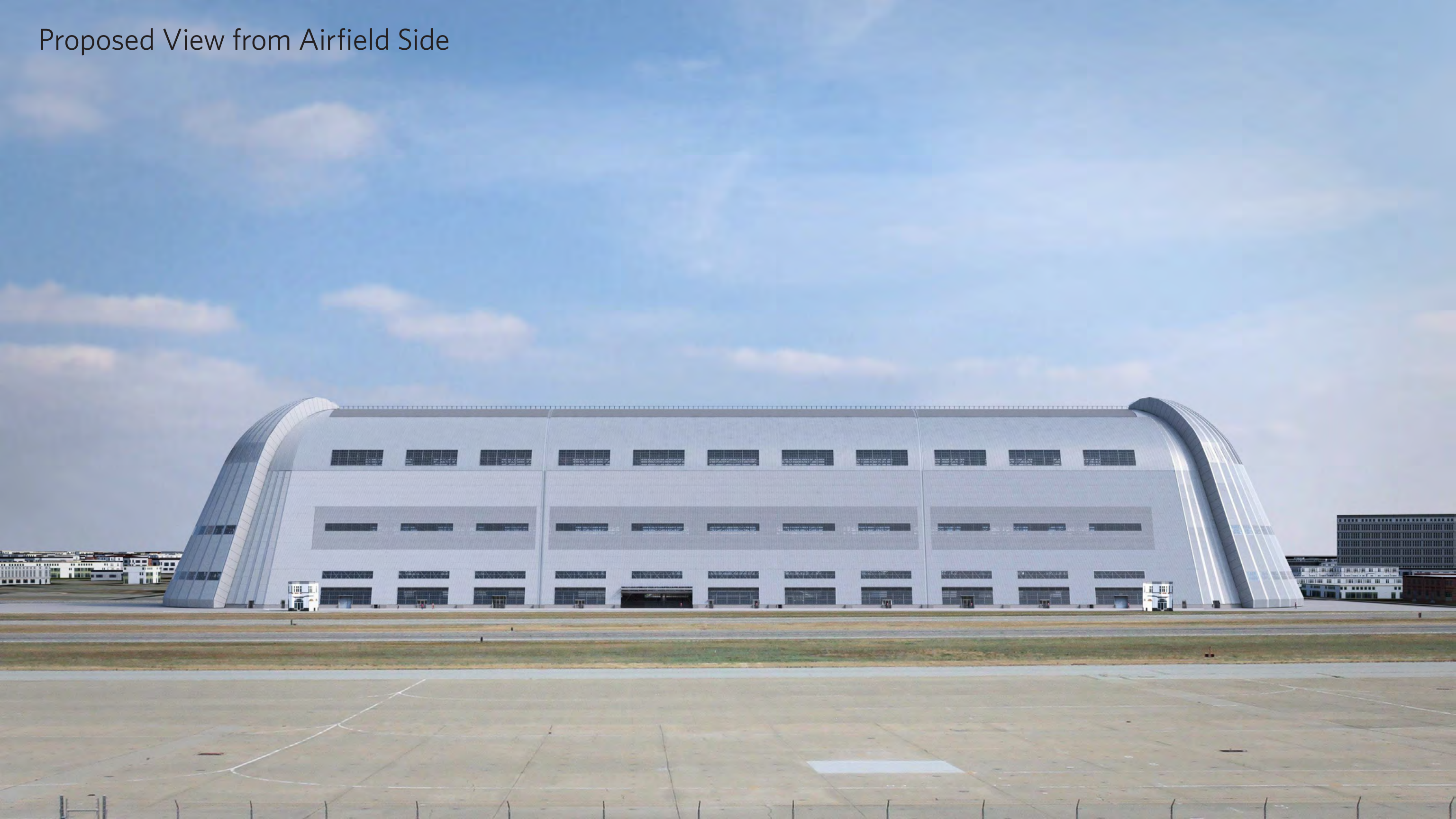
Proposed Airfield Typical Window Details



The louver system will consist of a perforated V-Beam extrusion so that the expanded glass area is not typically visible from the exterior, and the size, shape, and pattern of the historic windows will remain visible



Proposed View from Airfield Side



Hangar 1 Exterior Illumination Approach

Exterior Aesthetic Lighting Concept

In-ground aesthetic uplighting will be installed around the perimeter of the building to wash the walls, and fixtures concealed on the monitor will wash the roof



Exterior Aesthetic Lighting Concept

In-ground aesthetic uplighting will be installed around the perimeter of the building to wash the walls, and fixtures concealed on the monitor will wash the roof



Hangar 1 Interior Rehabilitation Approach

Interior Rehabilitation / Occupiable Upgrades Approach

Original arrangement
of interior spaces:
**Central volume
flanked by office and shop spaces**



Original Plan

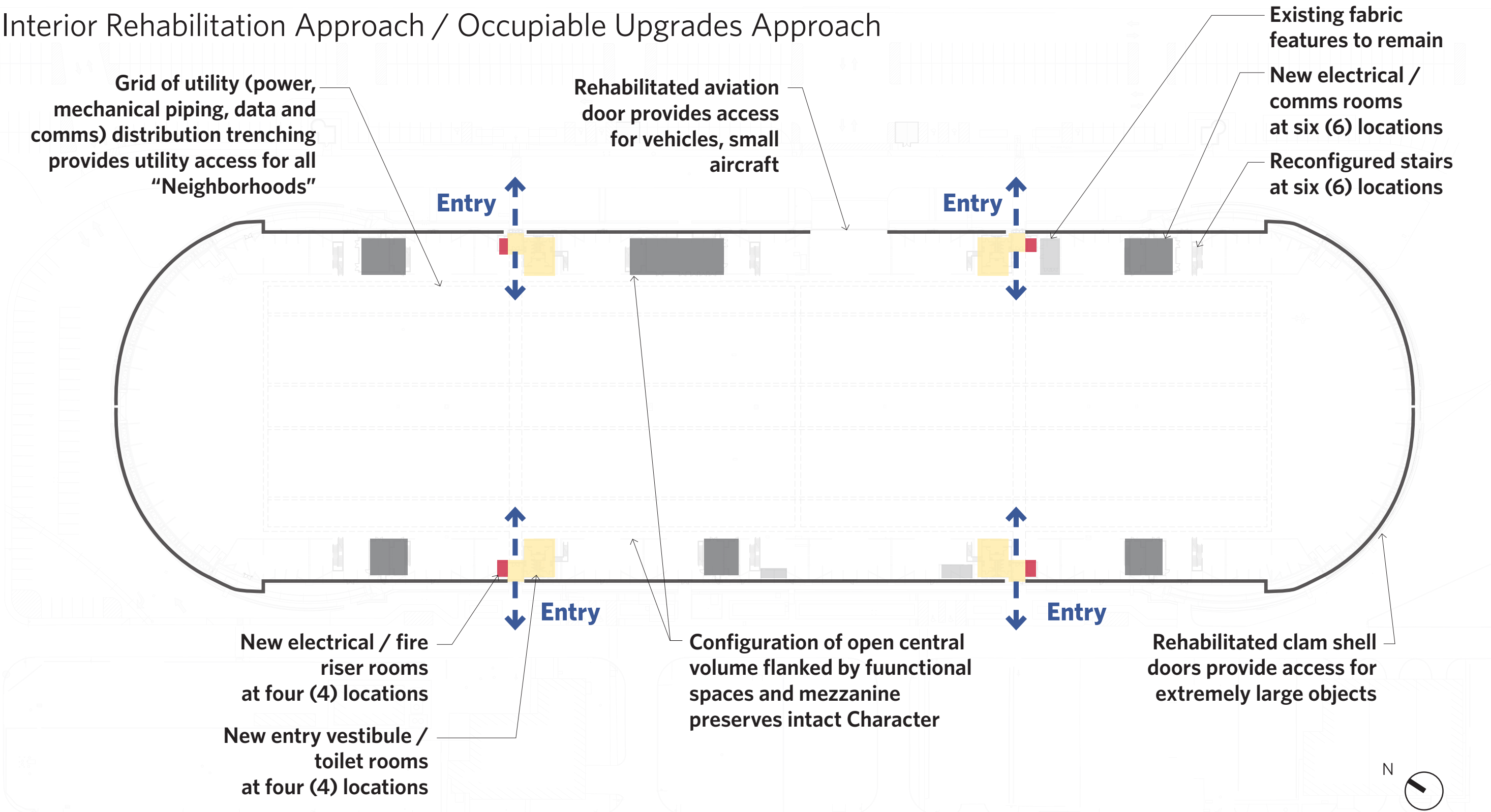
Proposed arrangement
of interior spaces:
**Central volume
flanked by office and shop spaces**



Proposed Plan



Interior Rehabilitation Approach / Occupiable Upgrades Approach



Typical Entrance Core

To maintain the overall visual effect of the hangar's interior, new entries will be located at building sides with structural frame exposed, as it was historically.



Rehabilitated Stair

New cast-in-place concrete cores containing building services will be constructed at multiple locations along the east and west sides of the building, under the mezzanine/level two; equipment will be screened from view by walls and / or parapets.



Rehabilitated Stair

Stairs will be reconstructed and reconfigured to provide required clearances and railings, using similar concrete and metal fabrications in similar locations as the originals, with finish colors easily distinguished from historic fabric.



Hangar 1 Interior Illumination Rehabilitation Approach

Interior Lighting

The original interior lighting scheme of Hangar 1 was designed to illuminate the cylindrical hull of the USS Macon from all sides. To provide illumination necessary for occupancy and maintenance, artificial illumination will be directed toward the ground floor surface.

**Original
illumination
target:
U.S.S. Macon**



**Proposed
illumination
target:
Hangar 1 occupied
ground floor level**

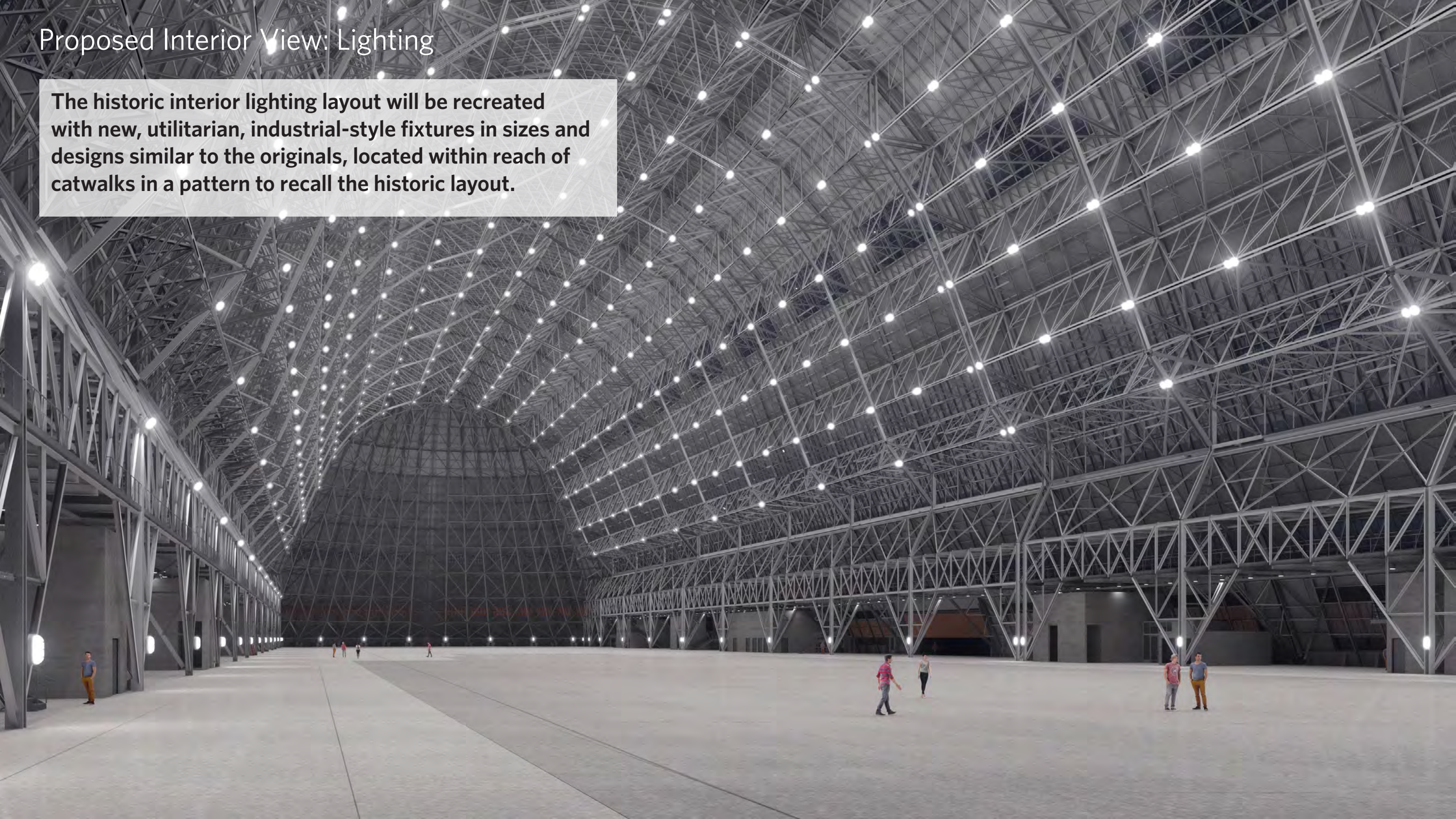


Hangar 1 Historic View: Interior



Proposed Interior View: Lighting

The historic interior lighting layout will be recreated with new, utilitarian, industrial-style fixtures in sizes and designs similar to the originals, located within reach of catwalks in a pattern to recall the historic layout.



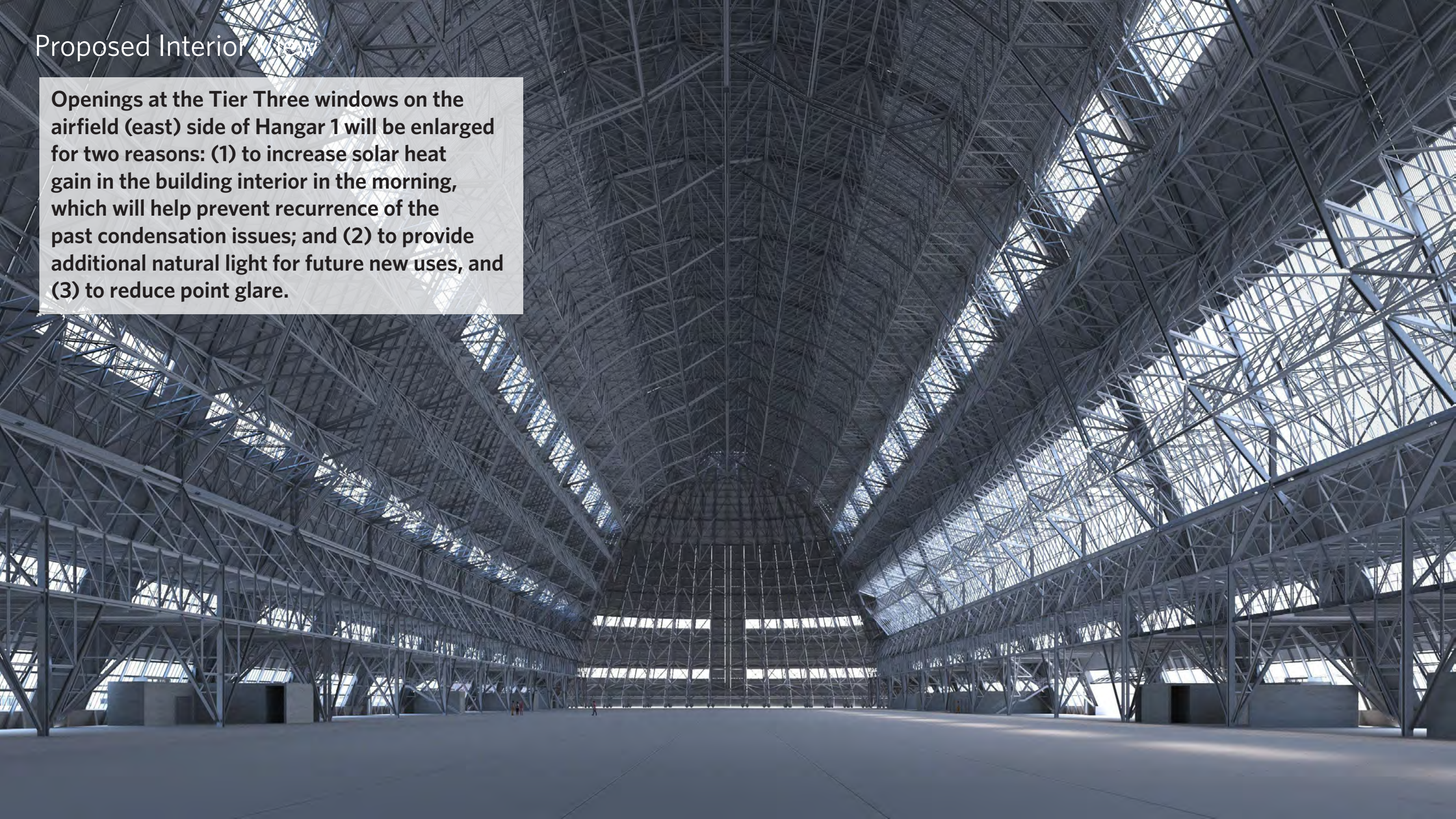
Hangar 1 Building Performance: Daylighting and Glare

Hangar 1 Historic View: Interior



Proposed Interior

Openings at the Tier Three windows on the airfield (east) side of Hangar 1 will be enlarged for two reasons: (1) to increase solar heat gain in the building interior in the morning, which will help prevent recurrence of the past condensation issues; and (2) to provide additional natural light for future new uses, and (3) to reduce point glare.



Hangar 1 Comparative Images, Historic and Proposed

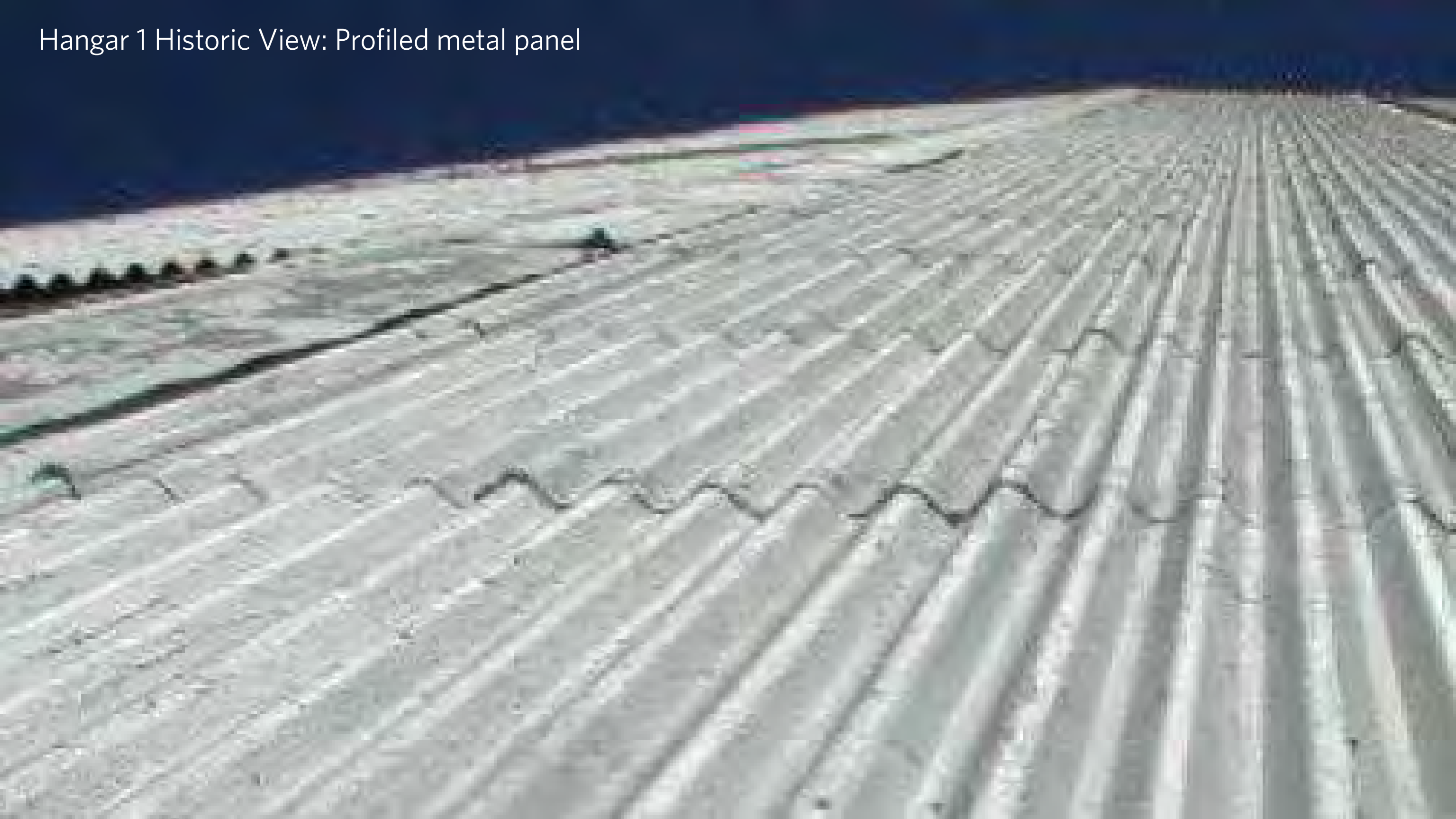
Hangar 1 Historic View: Shenandoah Plaza



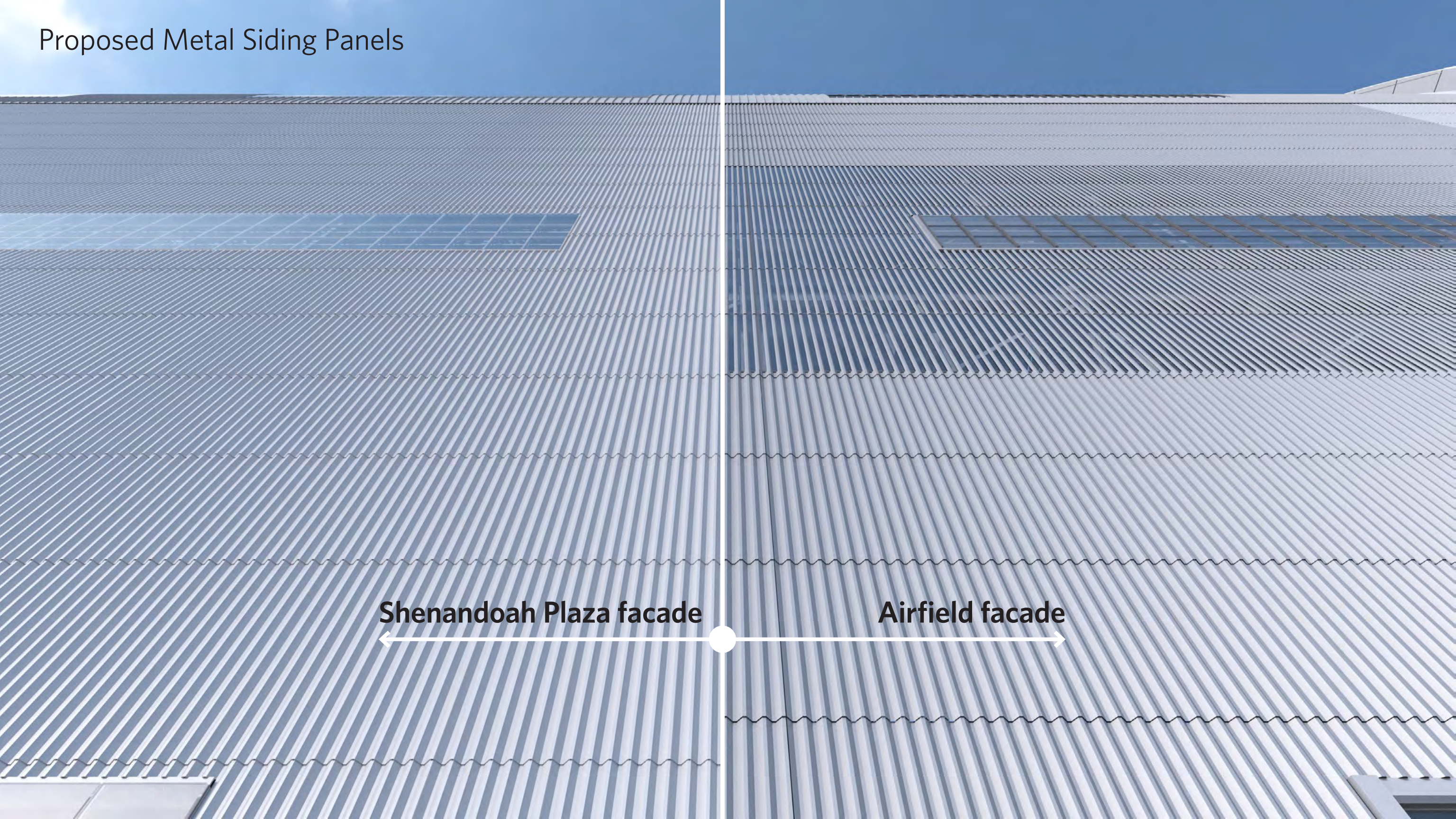
Proposed Shenandoah Plaza View



Hangar 1 Historic View: Profiled metal panel



Proposed Metal Siding Panels



Shenandoah Plaza facade

Airfield facade

Hangar 1 HABS View:
Airfield



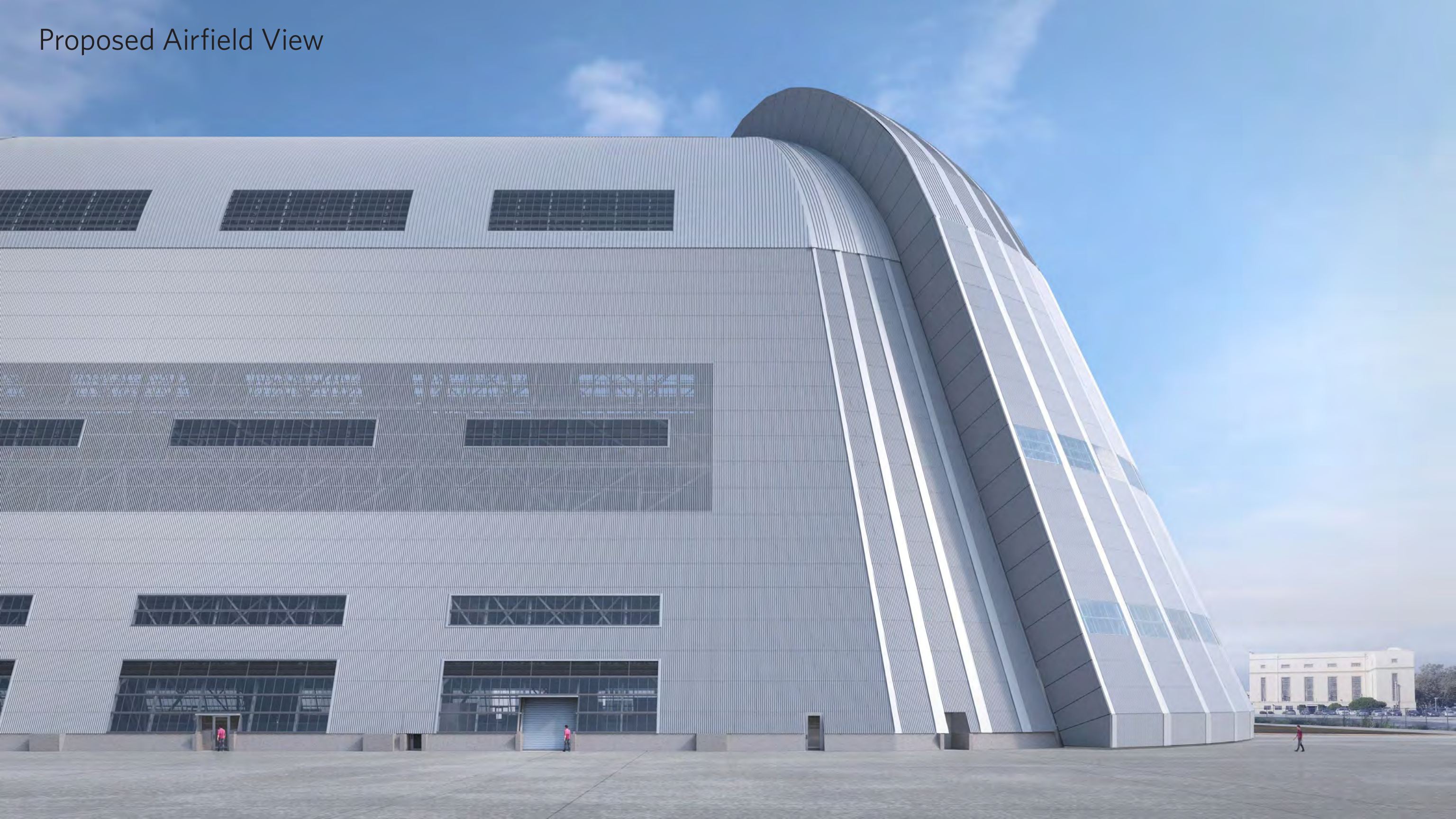
Proposed Airfield View



Hangar 1 HABS View: Airfield Facade



Proposed Airfield View



Hangar 1 HABS View: Window and Aviation Door Detail



Proposed Window and Aviation Door View



Hangar 1 View: Interior





Proposed Interior View

Hangar 1 Historic View: Shenandoah Plaza



Proposed View from Shenandoah Plaza



Hangar 1 Historic View: Shenandoah Plaza



Proposed View from Shenandoah Plaza



Appendix C

Renderings of Completed Project

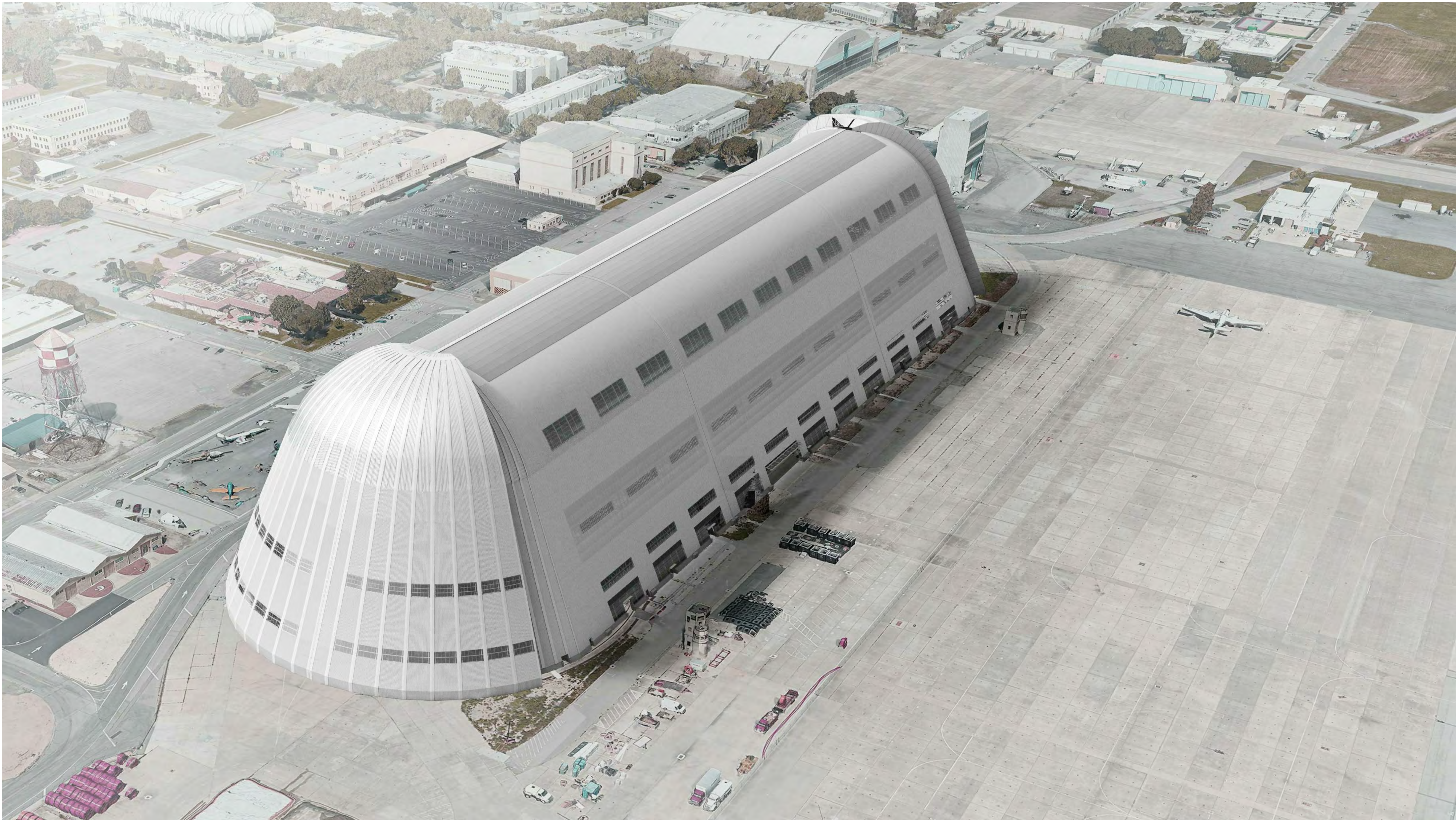
Hangar 1 Rehabilitation Project

Appendix C - Renderings of Completed Project

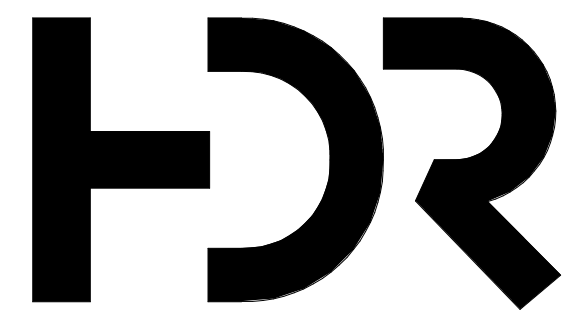
May 13, 2020



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Aerial View - Airfield side



HDR Architecture
201 California St.
Suite 1500
San Francisco CA 94111

PLANETARY
VENTURES LLC CBRE
Hangar 1

Moffett Federal Airfield
Mountain View, California

Project Manager	Greg Hadsell (HDR)
Project Designer	Michael Bardin (HDR)
Project Architect	Andrew Russell (HDR)
Landscape Architect	-
Civil Engineer	Chad Drago (HDR)
Structural Engineer	KPFF Consulting Engineers
Mechanical Engineer	Brian Perlberg (HDR)
Electrical Engineer	Paul Davis (HDR)
Plumbing Engineer	Brian Perlberg (HDR)
Fire Protection Engineer	Robert Richter (HDR)
Facade Engineer	Anup

Sheet Reviewer		Author
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Project Number	10170241
Original Issue	2/12/2020

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3D VIEWS

Sheet Number
A-904

Project Status
SECTION 106 TECHNICAL REPORT- APPENDIX A

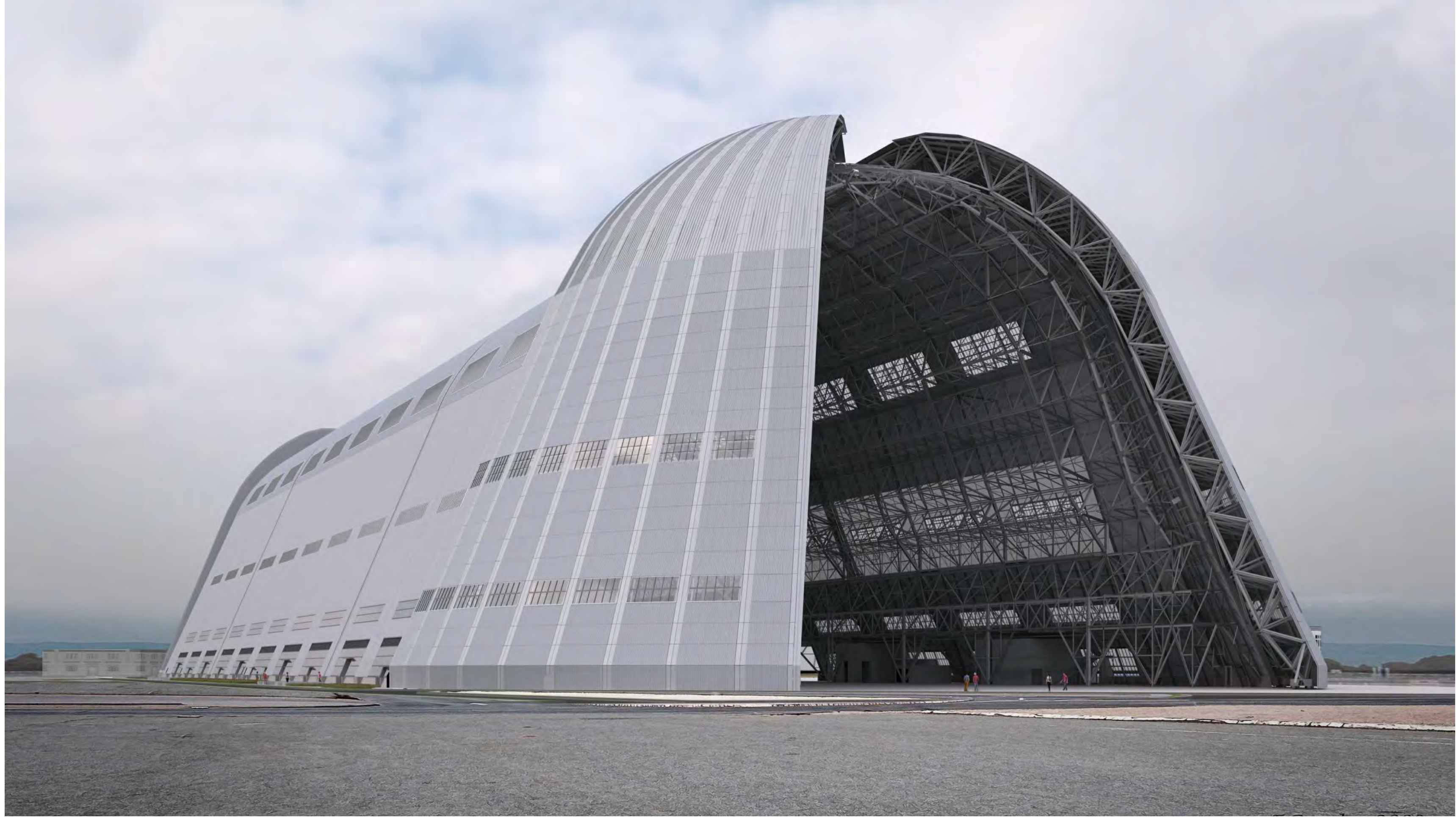
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West Elevation - Shenandoah Plaza Historic District side



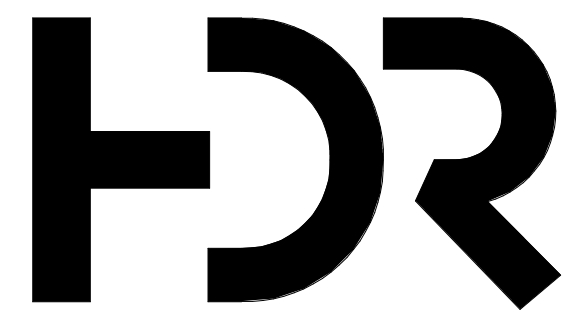
East Elevation - Moffett Federal Airfield side



Perspective from Airfield



Interior Perspective



HDR Architecture
201 California St.
Suite 1500
San Francisco CA 94111

PLANETARY
VENTURES LLC CBRE
Hangar 1

Moffett Federal Airfield
Mountain View, California

Project Manager	Greg Hadsell (HDR)
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Facade Engineer	Anup

Sheet Reviewer	Author
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MARK	DATE	DESCRIPTION
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Original Issue	2/12/2020

Sheet Name

3D VIEWS

Sheet Number

A-905

Project Status

SECTION 106 TECHNICAL REPORT- APPENDIX A

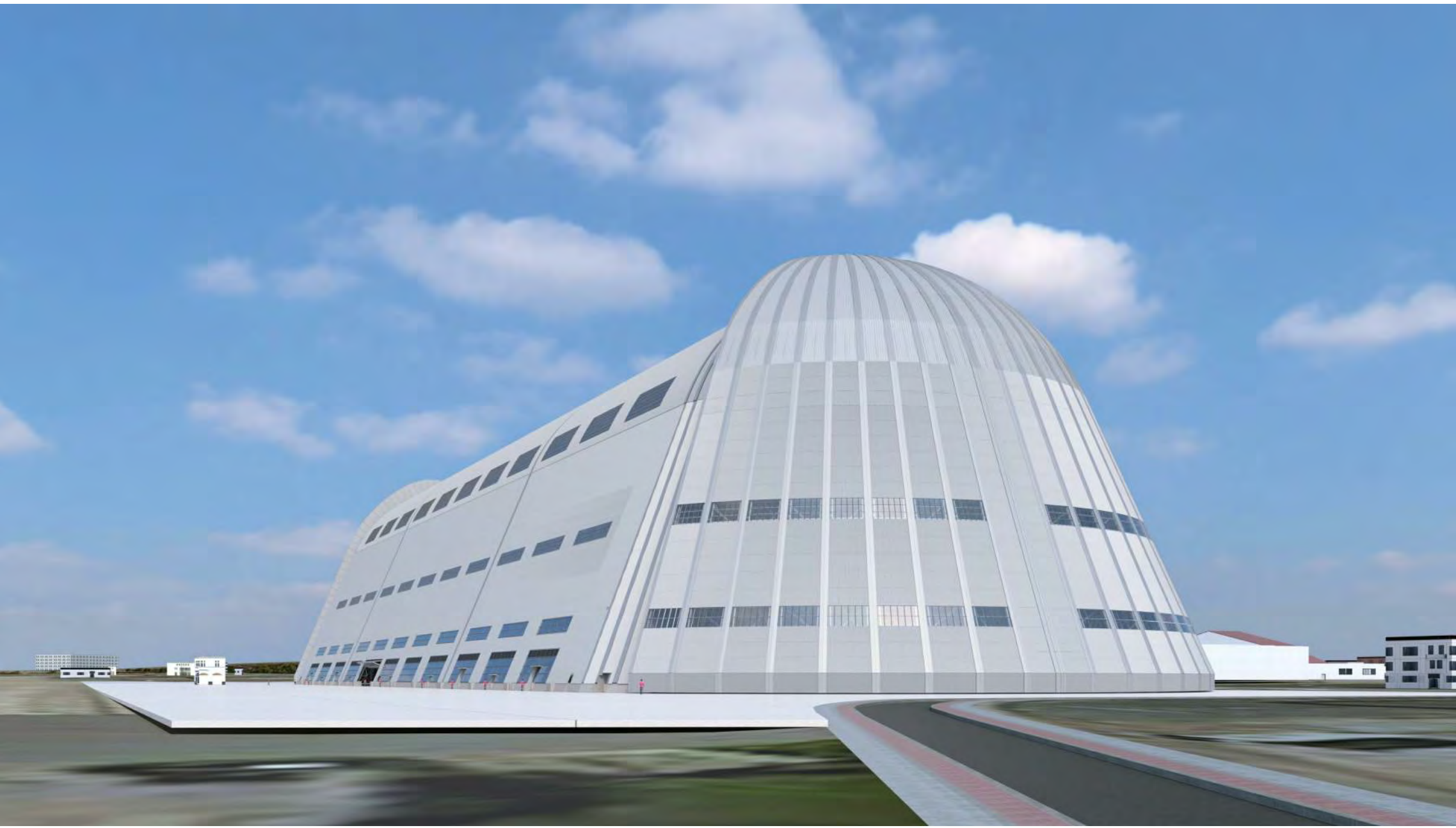
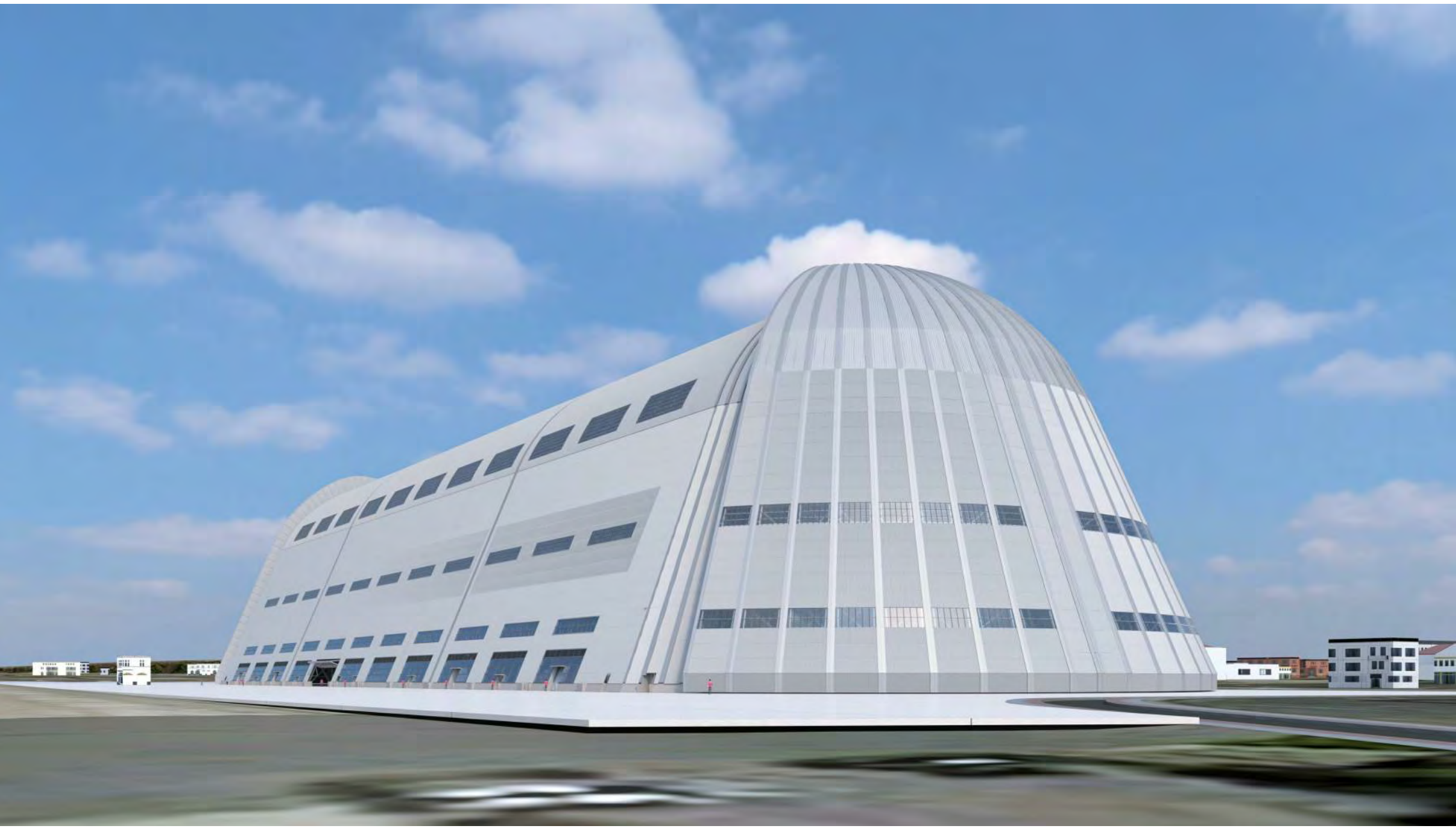
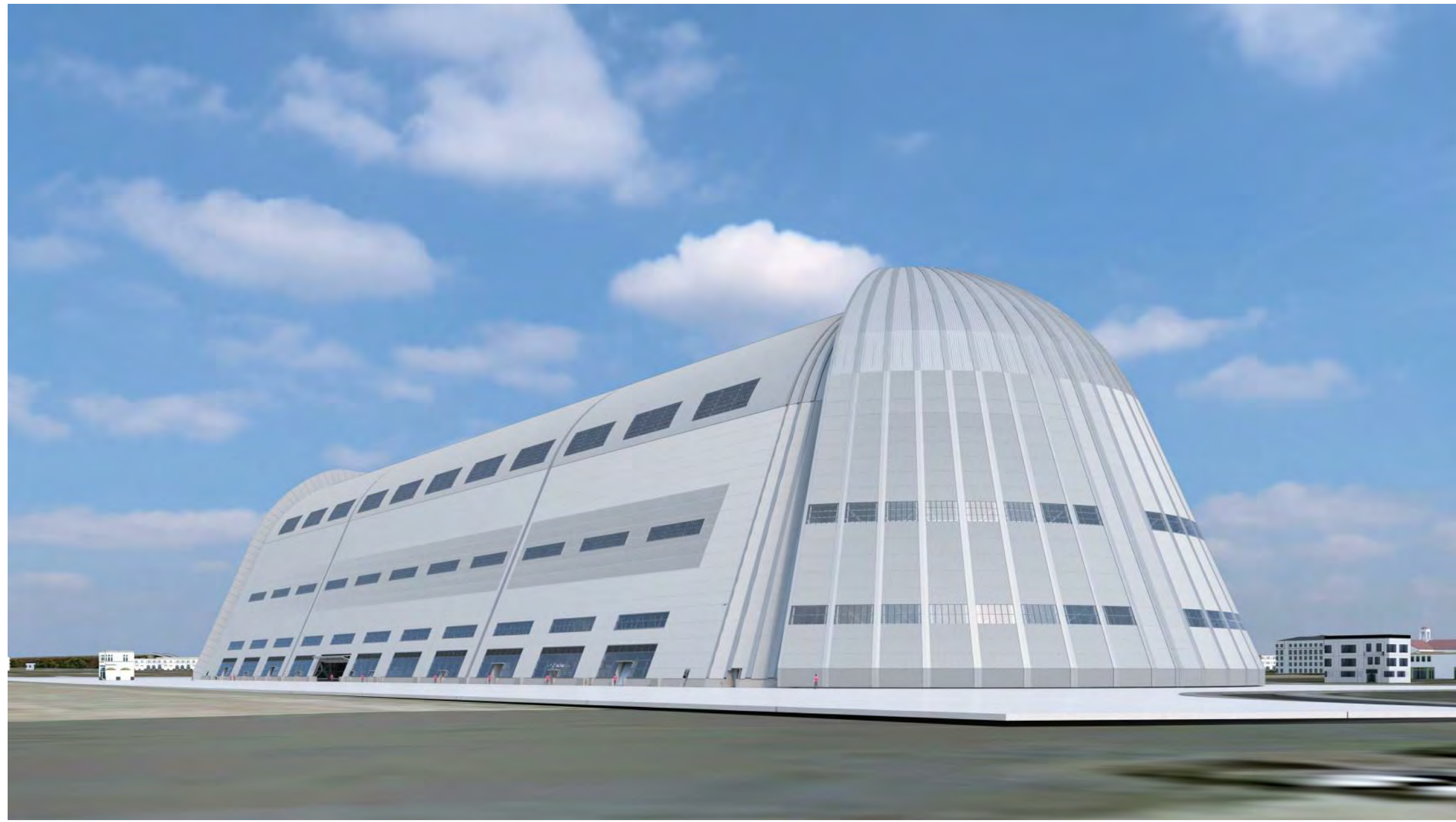
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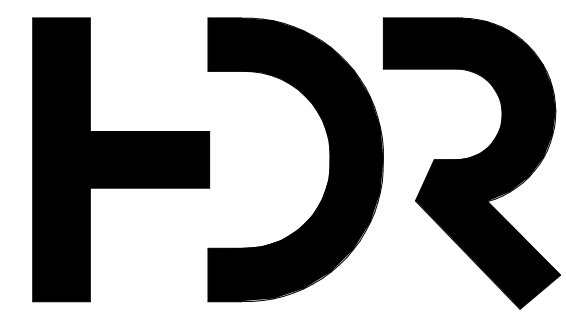
Ground Level View - Airfield Side



Facade Detail - Airfield Side



Perspectives from Airfield



HDR Architecture
201 California St.
Suite 1500
San Francisco CA 94111

PLANETARY
VENTURES LLC CBRE
Hangar 1

Moffett Federal Airfield
Mountain View, California

Project Manager	Greg Hadsell (HDR)
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Plumbing Engineer	Brian Perlberg (HDR)
Fire Protection Engineer	Robert Richter (HDR)
Facade Engineer	Anup

Sheet Reviewer Author

MARK	DATE	DESCRIPTION
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Project Number	10170241
Original Issue	2/12/2020

Sheet Name

3D VIEWS

Sheet Number

A-906

Project Status

SECTION 106 TECHNICAL REPORT- APPENDIX A



Typical Entrance Lobby



Typical Stair and Electrical Room



Typical Stair to Mechanical Level



Interior Perspective Night

PLANETARY
VENTURES LLC CBRE
Hangar 1

Moffett Federal Airfield
Mountain View, California

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Facade Engineer	Anup

Sheet Reviewer

Author

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Project Number
Original Issue

10170241
2/12/2020

Sheet Name

3D VIEWS

Sheet Number

A-907

Project Status

SECTION 106 TECHNICAL REPORT- APPENDIX A

The following content was redacted from this public posting:

Appendix D: Structural Strengthening Approach

Appendix E

Consulting Party Letters

National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Herb Parsons
President
Moffett Field Historical Society
P.O. Box 16
Moffett Field, CA 94035-0016

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Mr. Parsons,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

In 2002, an investigation was undertaken to test the building materials in Hangar 1 for PCBs and other potential contaminants, specifically lead and asbestos. The results of this sample and analysis program confirmed that the Hangar 1 siding contained PCBs and asbestos and that the lead-based paint (LBP) used to cover both the siding and the steel frame also contained PCBs at elevated concentrations. Due to the presence of PCBs and lead in Hangar 1 building materials, in 2002, NASA ARC closed the hangar to all personnel except those involved in essential maintenance, abatement, or environmental cleanup activities. From 2010 to 2013 abatement of hazardous materials at Hangar 1 was undertaken, including the removal of the siding and roofing, deconstruction of interior structures, cleaning by high-pressure washing and preparation of steel and/or concrete surfaces, and application of an epoxy coating system to encapsulate residual PCBs.

In 2014, Planetary Ventures, LLC (PV) entered into a lease agreement with NASA ARC for the MFA premises, including use of Hangar 1 for research and development, such as testing and light assembly uses related to space, aviation, rover/robotics and other emerging technologies. NASA ARC is currently reviewing PV's proposed rehabilitation plans for Hangar 1, which would qualify as a federal undertaking under Section 106 of the NHPA. The rehabilitation will be completed in two phases. Phase I will address the abatement of the steel frame and concrete walls to control the release of PCB- and lead-impacted paint, and asbestos-containing materials. To reduce the potential risks to human health and the environment, the coatings need to be abated as soon as possible. Phase II comprises the exterior re-cladding, seismic strengthening, and core interior improvements for occupancy of Hangar 1. The proposed rehabilitation includes a metal skin, glazing systems, and roofing system to ensure that the hangar is enclosed and that past performance issues are addressed. These features have been designed to recreate the appearance of the original features and materials of Hangar 1.

NASA ARC is contacting you to assess your organization's interest in participating as a consulting party as defined in 36 CFR Section 800.2(c) in the Section 106 of the NHPA review process for the Hangar 1 Rehabilitation Project. If you would like to participate, you may elect to do so by sending written notification by email with the subject heading "Hangar 1 Section 106 Consultation Interested Party" to Jonathan.d.ikan@nasa.gov within the next 30 days. Please include the following information:

1. Name
2. Title
3. Organization/Affiliation
4. Address
5. Email address
6. Phone number
7. Statement of election to participate as a consulting party

Please contact me if you have any questions pertaining to this process. I appreciate your attention and look forward to hearing from you regarding this Undertaking.

Sincerely,



Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
(605) 604-6859
Jonathan.d.ikan@nasa.gov

Cc:

Ms. Rebecca Klein, NASA FPO
Environmental Management Division
NASA Headquarters
300 E Street, SW
Washington, DC 20546-0001

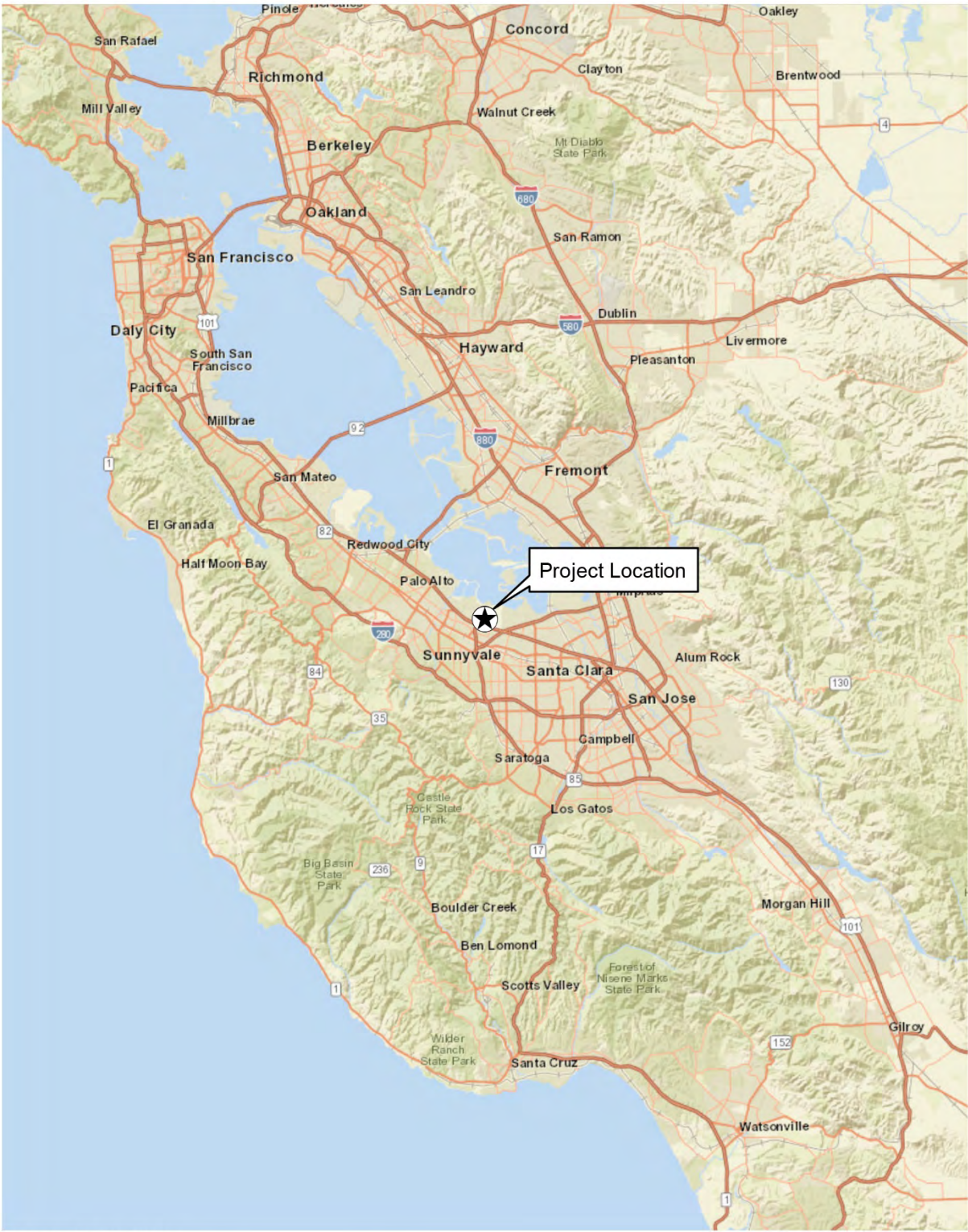
Lease Administration Team
Planetary Ventures
1600 Amphitheater Pkwy
Mountain View, CA 94043

Legal Department/Legal Matters
Planetary Ventures
1600 Amphitheater Pkwy
Mountain View, CA 94043

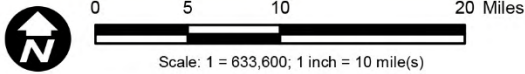
Attachments:

Figure 1. Regional Project Location Map

FIGURE 1: Regional Project Location Map



Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Trudi Ryan
Community Development Director
City of Sunnyvale
456 W. Olive Avenue
Sunnyvale, CA 94086

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Ms. Ryan,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

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Please contact me if you have any questions pertaining to this process. I appreciate your attention and look forward to hearing from you regarding this Undertaking.

Sincerely,



Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
(605) 604-6859
Jonathan.d.ikan@nasa.gov

Cc:

Ms. Rebecca Klein, NASA FPO
Environmental Management Division
NASA Headquarters
300 E Street, SW
Washington, DC 20546-0001

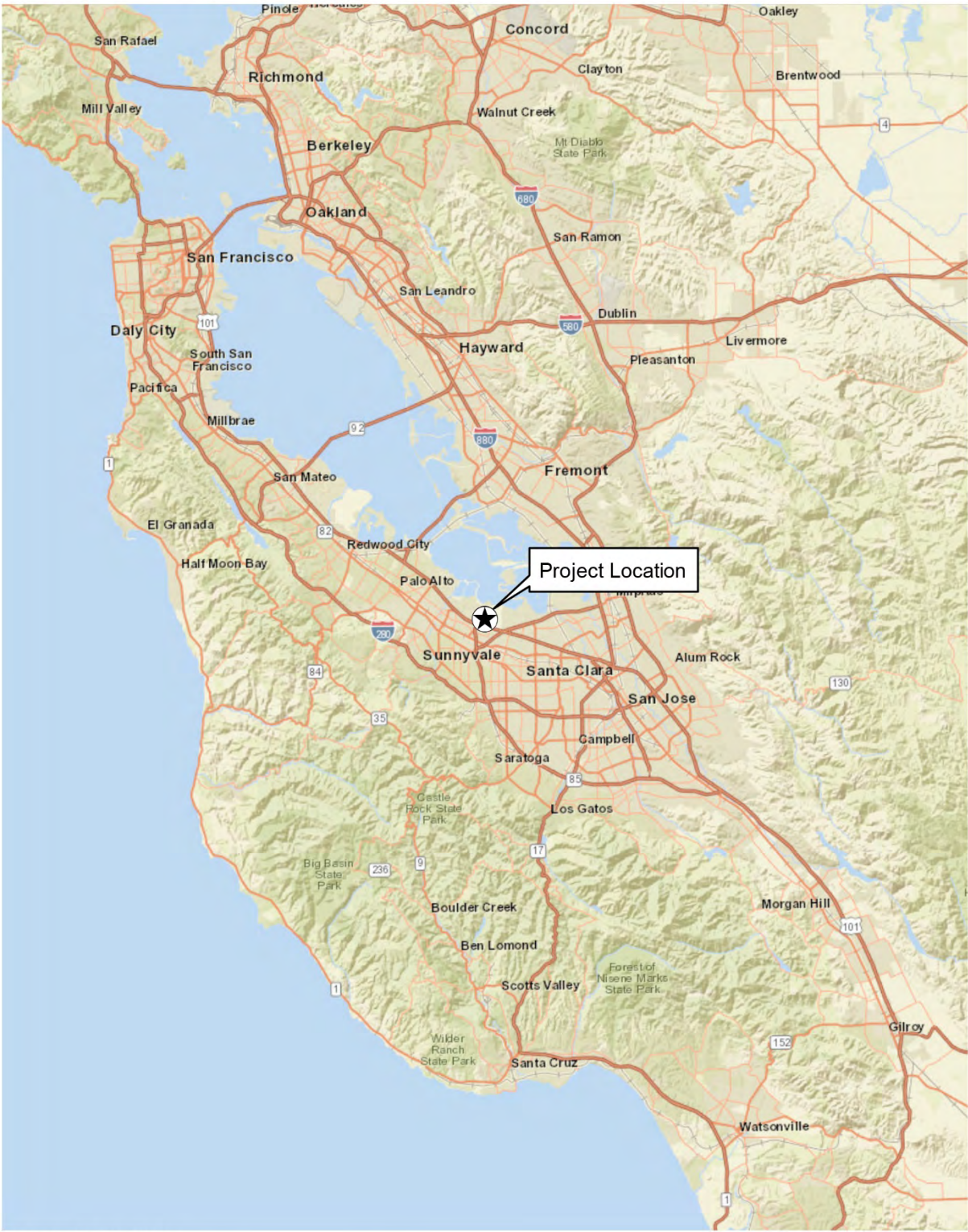
Lease Administration Team
Planetary Ventures
1600 Amphitheater Pkwy
Mountain View, CA 94043

Legal Department/Legal Matters
Planetary Ventures
1600 Amphitheater Pkwy
Mountain View, CA 94043

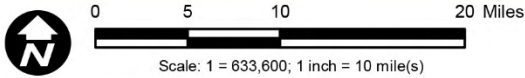
Attachments:

Figure 1. Regional Project Location Map

FIGURE 1: Regional Project Location Map



Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Aarti Shrivastava
Assistant City Manager/Community Development Director
City of Mountain View
500 Castro Street, 1st Floor
Mountain View, CA 94035-0016

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames
Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Ms. Shrivastava,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

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Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
(605) 604-6859
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Cc:

Ms. Rebecca Klein, NASA FPO
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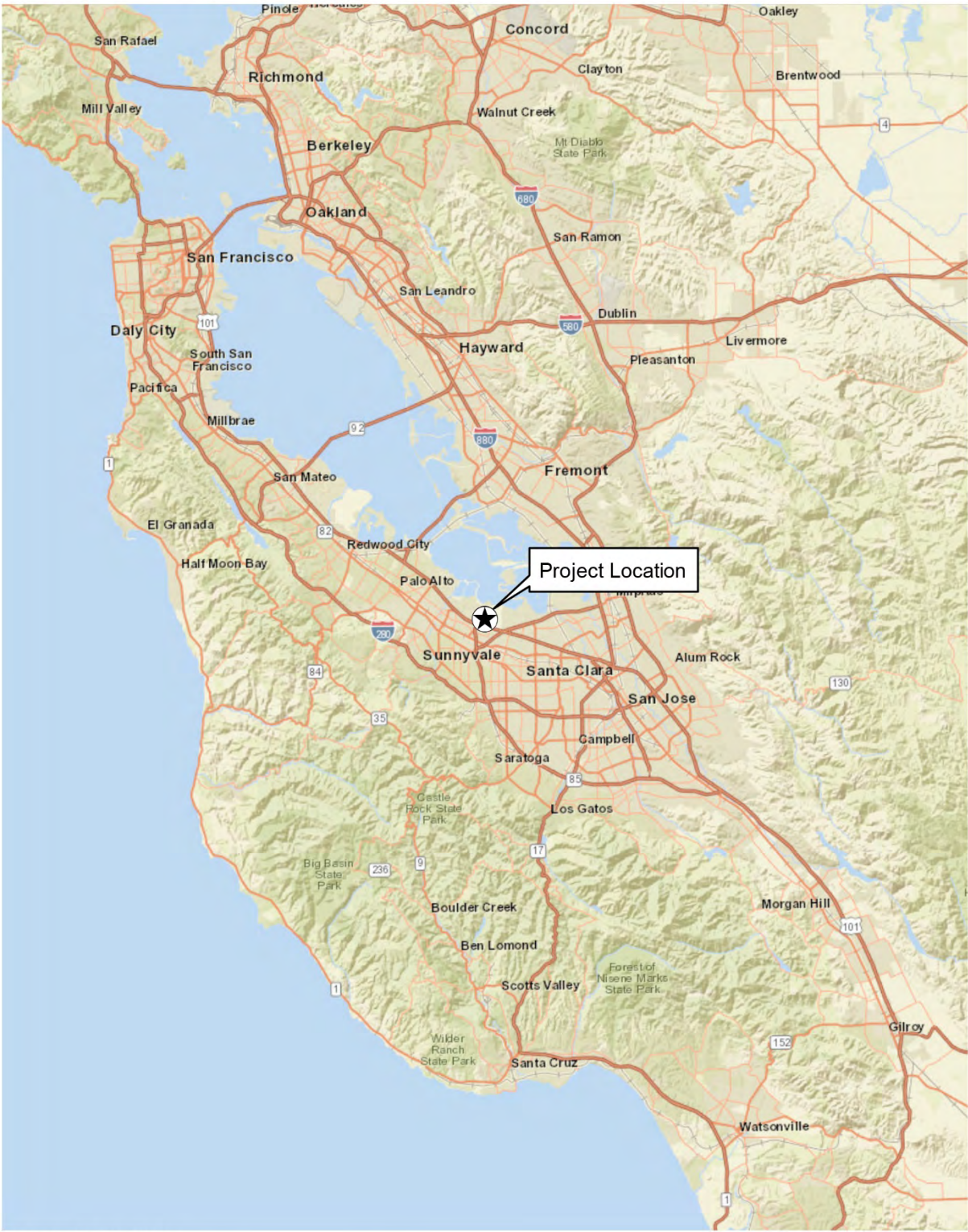
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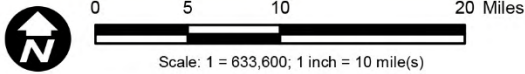
Attachments:

Figure 1. Regional Project Location Map

FIGURE 1: Regional Project Location Map



Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Laura Babcock
Director
Sunnyvale Historical Society
P.O. Box 2187
Sunnyvale, CA 94087-0187

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Ms. Babcock,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

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NASA ARC is contacting you to assess your organization's interest in participating as a consulting party as defined in 36 CFR Section 800.2(c) in the Section 106 of the NHPA review process for the Hangar 1 Rehabilitation Project. If you would like to participate, you may elect to do so by sending written notification by email with the subject heading "Hangar 1 Section 106 Consultation Interested Party" to Jonathan.d.ikan@nasa.gov within the next 30 days. Please include the following information:

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Please contact me if you have any questions pertaining to this process. I appreciate your attention and look forward to hearing from you regarding this Undertaking.

Sincerely,



Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
(605) 604-6859
Jonathan.d.ikan@nasa.gov

Cc:

Ms. Rebecca Klein, NASA FPO
Environmental Management Division
NASA Headquarters
300 E Street, SW
Washington, DC 20546-0001

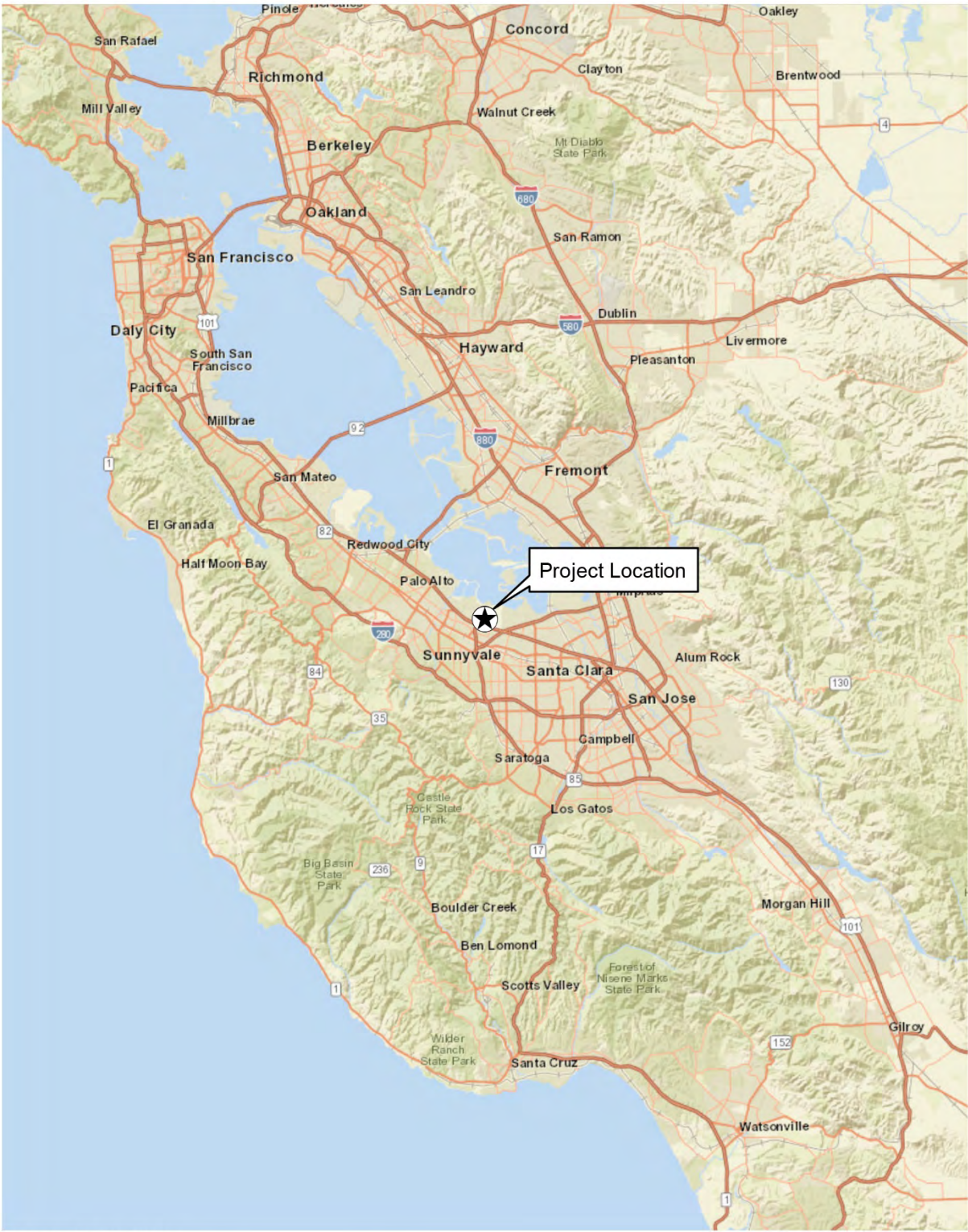
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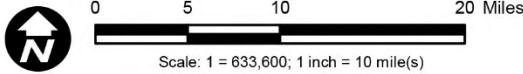
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Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Nick Perry
President
Mountain View Historical Association
P.O. Box 252
Mountain View, CA 94042

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Mr. Perry,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

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Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
(605) 604-6859
Jonathan.d.ikan@nasa.gov

Cc:

Ms. Rebecca Klein, NASA FPO
Environmental Management Division
NASA Headquarters
300 E Street, SW
Washington, DC 20546-0001

Lease Administration Team
Planetary Ventures
1600 Amphitheater Pkwy
Mountain View, CA 94043

Legal Department/Legal Matters
Planetary Ventures
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Attachments:

Figure 1. Regional Project Location Map

[illegible]

0 5 10 20 Miles
Scale: 1 = 633,600; 1 inch = 10 mile(s)

National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

William P. Schroh, Jr.
President & CEO
History San Jose
1650 Senter Road
San Jose, CA 95112

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Mr. Schroh,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

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Sincerely,



Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
(605) 604-6859
Jonathan.d.ikan@nasa.gov

Cc:

Ms. Rebecca Klein, NASA FPO
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NASA Headquarters
300 E Street, SW
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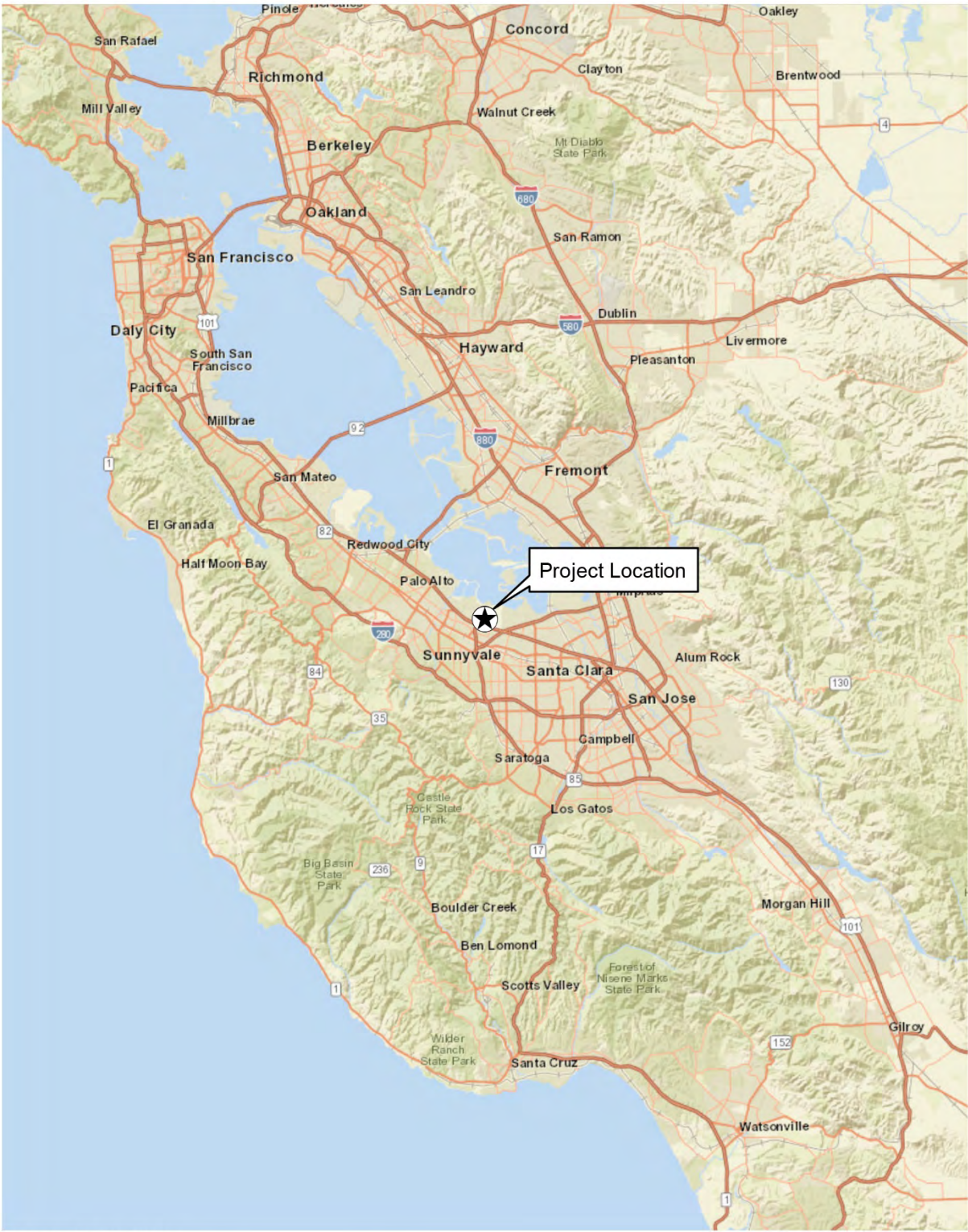
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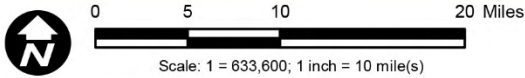
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Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Cindy Heitzman
Executive Director
California Preservation Foundation
101 The Embarcadero, Suite 120
San Francisco, CA 94105-1215

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames
Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Ms. Heitzman,

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NASA Ames Research Center, Mail Stop 213-8
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Cc:

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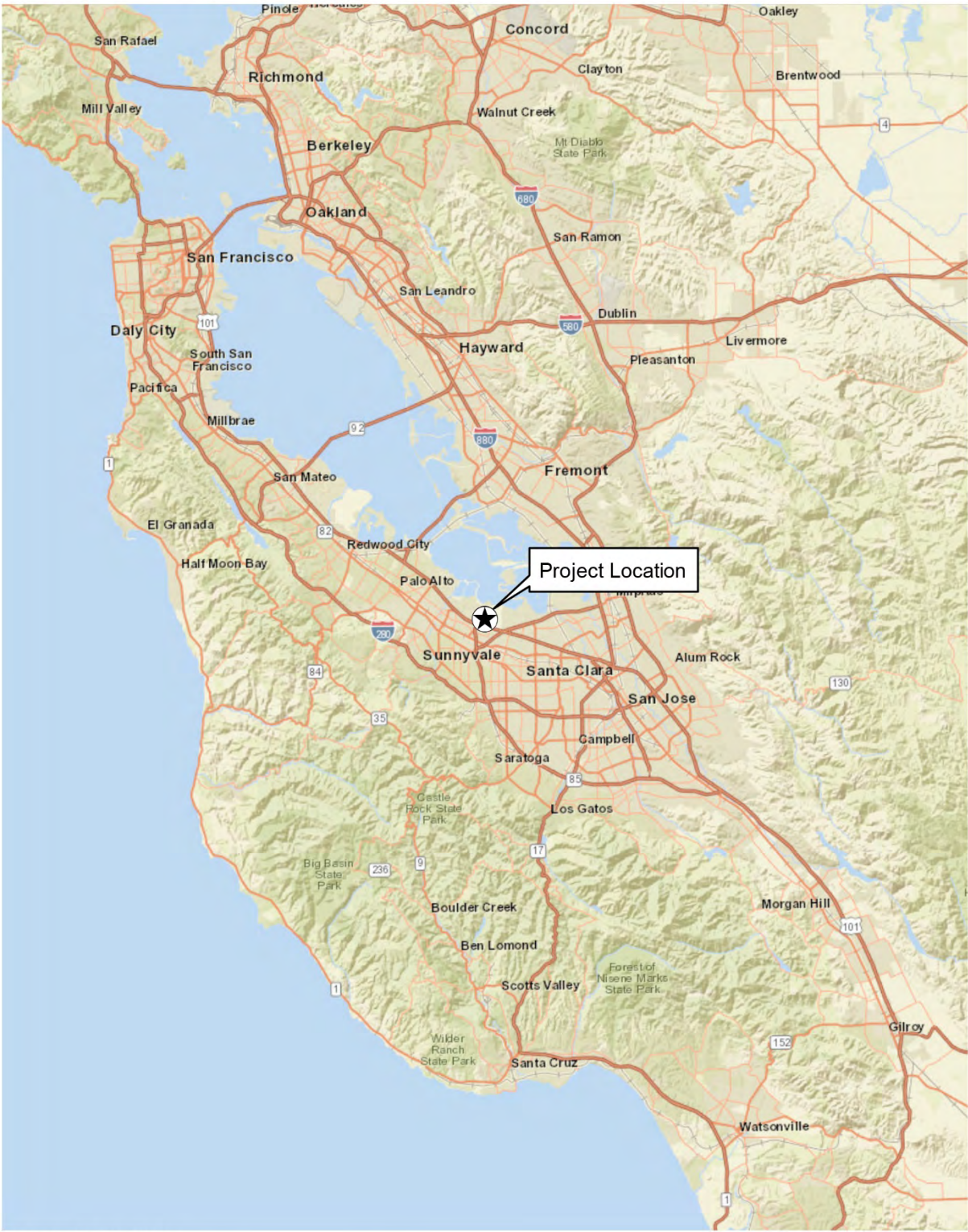
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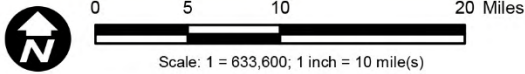
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Figure 1. Regional Project Location Map

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Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Christina Morris
Field Director
National Trust for Historic Preservation, Los Angeles Office
700 Flower Street, Suite 1100
Los Angeles, CA 90017

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames
Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Ms. Morris,

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Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
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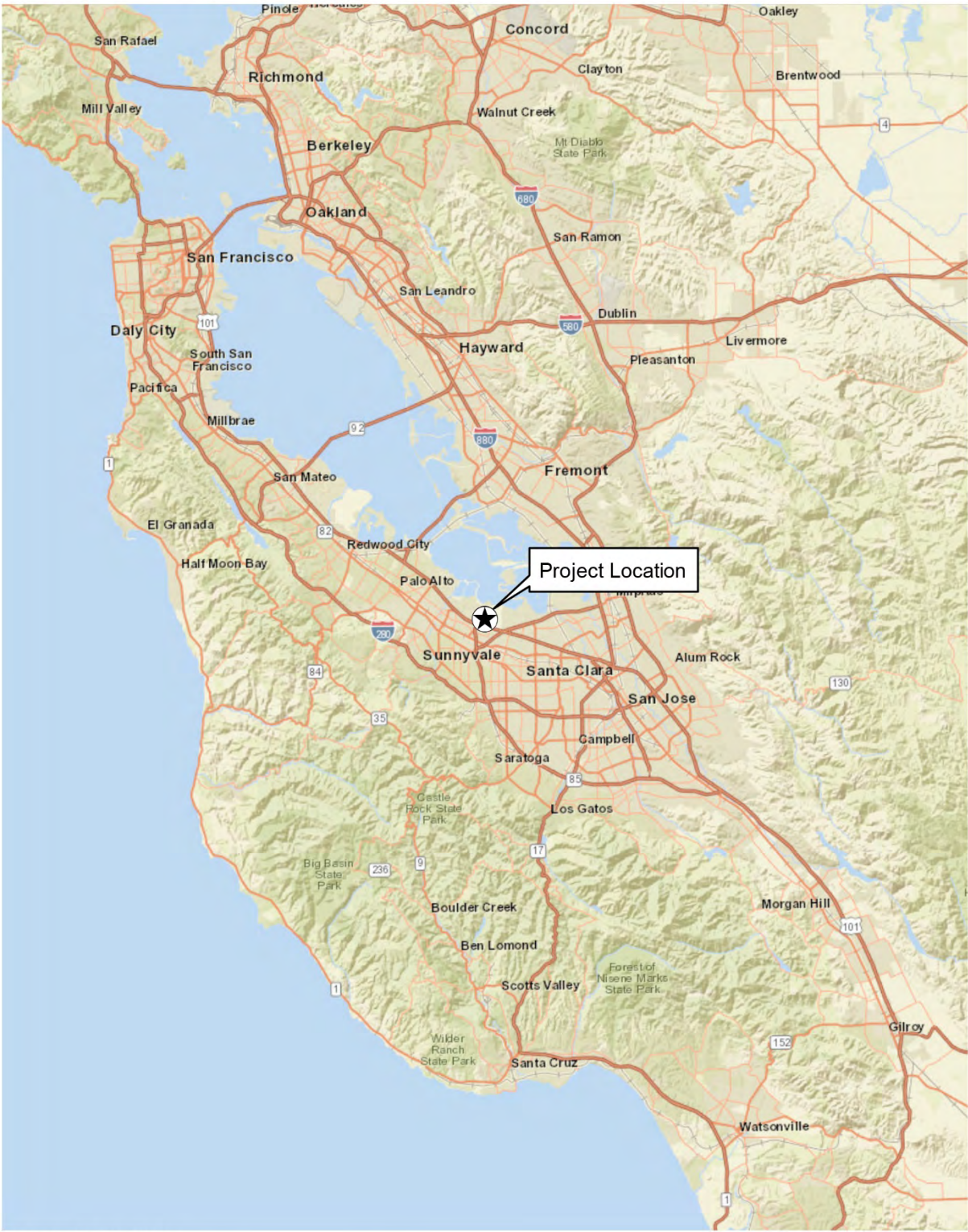
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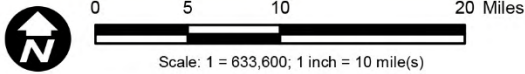
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Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

April 1, 2020

John McLaughlin
Silicon Valley Historical Society
1134 Crane Street, Suite 216
Menlo Park, CA 94025

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Mr. McLaughlin,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

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Moffett Field, CA 94035
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Cc:

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Attachments:

Figure 1. Regional Project Location Map

A detailed map of the San Francisco Bay Area and surrounding regions. The map shows major cities such as San Francisco, Oakland, Berkeley, Richmond, Concord, Walnut Creek, San Ramon, Dublin, Hayword, Fremont, Redwood City, Palo Alto, Sunnyvale, Santa Clara, San Jose, Campbell, Saratoga, Los Gatos, Morgan Hill, Gilroy, Watsonville, Santa Cruz, Ben Lomond, Boulder Creek, Scotts Valley, and San Mateo. Major highways are shown in red, including I-80, I-680, I-880, I-92, I-94, I-17, I-101, I-152, SR-84, SR-82, SR-92, SR-236, and SR-152. A black star icon marks the "Project Location" near Palo Alto, with a callout box pointing to it. The map also shows geographical features like Mt. Diablo State Park, Castle Rock State Park, Big Basin State Park, and Forest of Nisene Marks State Park. The terrain is depicted with green and brown shading to represent elevation.

0 5 10 20 Miles
Scale: 1 = 633,600; 1 inch = 10 mile(s)

National Aeronautics and Space Administration



Ames Research Center

Moffett Field, California 94035

February 19, 2020

Monica Arellano
Muwekma Ohlone Indian Tribe of the San Francisco Bay Area
20885 Redwood Road, Suite 232
Castro Valley, CA 94546

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames
Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Ms. Arellano,

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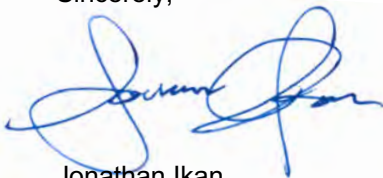
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NASA ARC is contacting you to assess your organization's interest in participating as a consulting party as defined in 36 CFR Section 800.2(c) in the Section 106 of the NHPA review process for the Hangar 1 Rehabilitation Project. If you would like to participate, you may elect to do so by sending written notification by email with the subject heading "Hangar 1 Section 106 Consultation Interested Party" to me at Jonathan.d.ikan@nasa.gov within the next 30 days. Please include the following information:

1. Name
2. Title
3. Organization/Affiliation
4. Address
5. Email address
6. Phone number
7. Statement of election to participate as a consulting party

Please contact me if you have any questions pertaining to this process. I appreciate your attention and look forward to hearing from you regarding this Undertaking.

Sincerely,



Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
(605) 604-6859
Jonathan.d.ikan@nasa.gov

Cc:

Ms. Rebecca Klein, NASA FPO
Environmental Management Division
NASA Headquarters
300 E Street, SW
Washington, DC 20546-0001

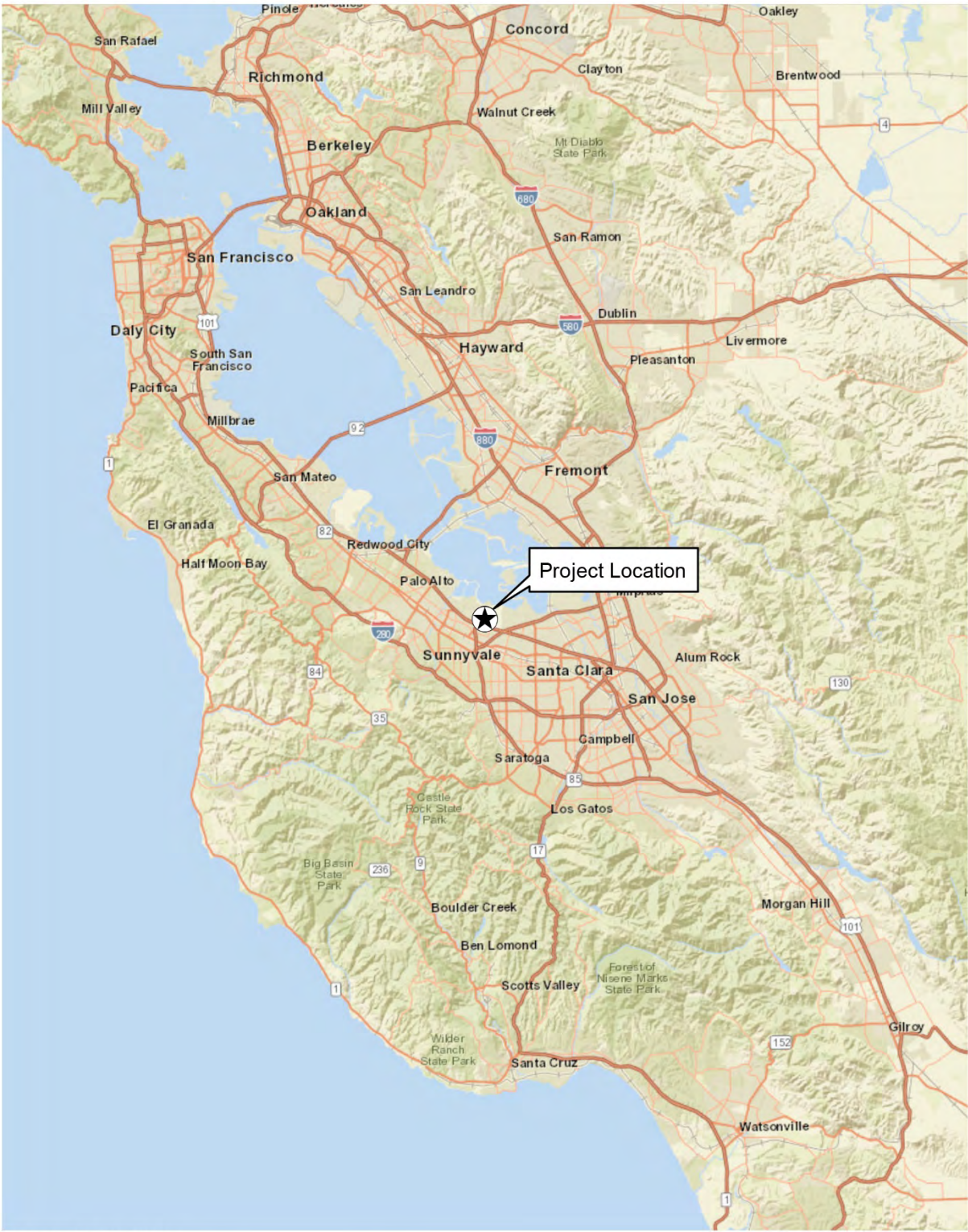
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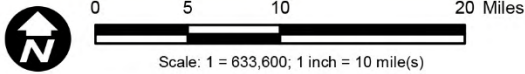
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Attachments: Figure 1. Regional Project Location Map

FIGURE 1: Regional Project Location Map



Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames
Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Chairperson Sayers,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

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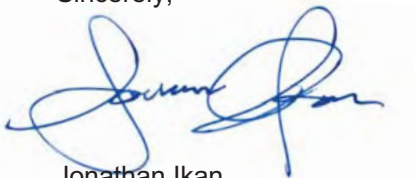
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NASA ARC is contacting you to assess your organization's interest in participating as a consulting party as defined in 36 CFR Section 800.2(c) in the Section 106 of the NHPA review process for the Hangar 1 Rehabilitation Project. If you would like to participate, you may elect to do so by sending written notification by email with the subject heading "Hangar 1 Section 106 Consultation Interested Party" to me at Jonathan.d.ikan@nasa.gov within the next 30 days. Please include the following information:

1. Name
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Please contact me if you have any questions pertaining to this process. I appreciate your attention and look forward to hearing from you regarding this Undertaking.

Sincerely,



Jonathan Ikan
Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
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Cc:

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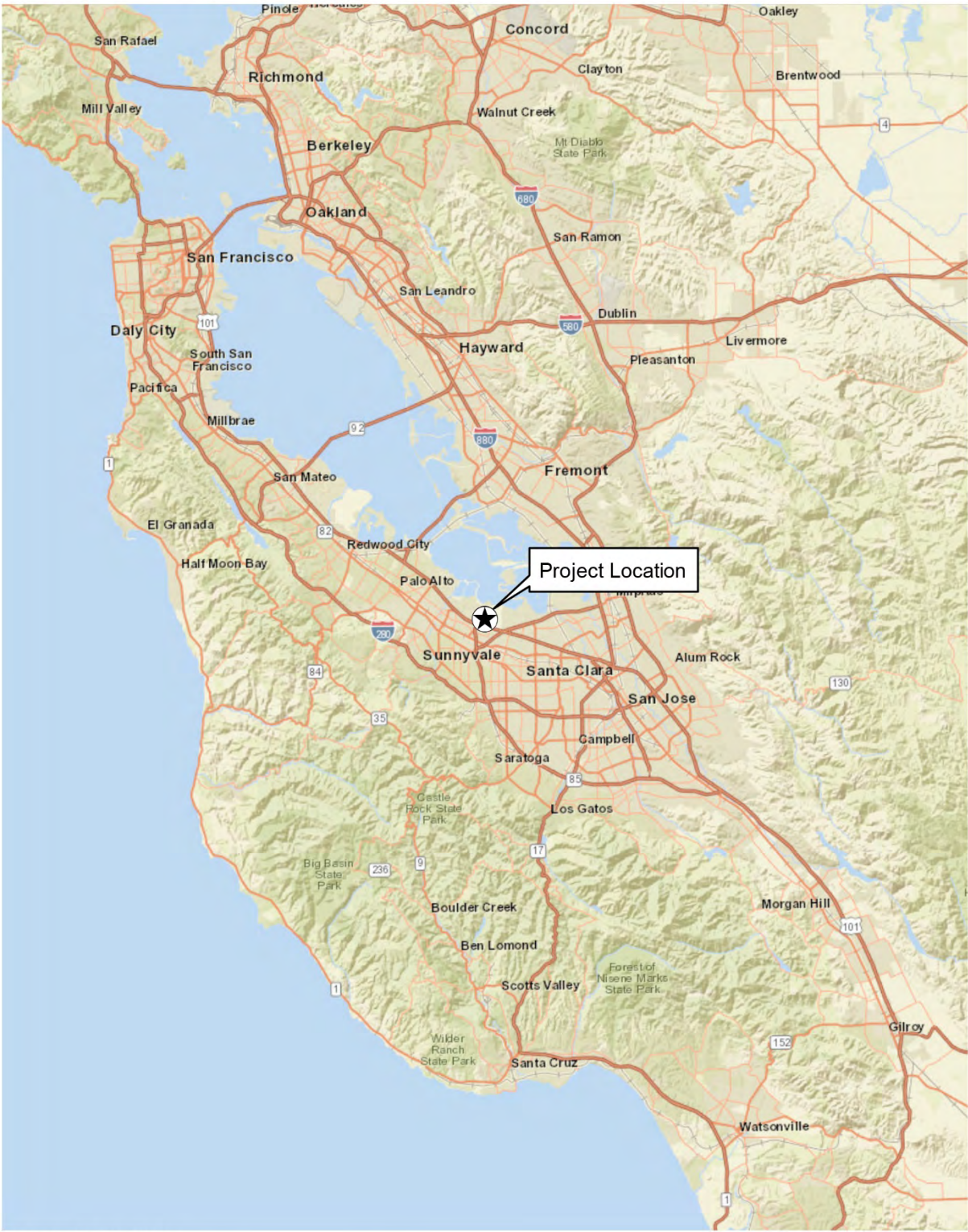
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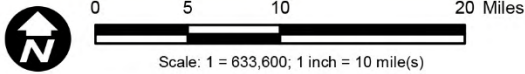
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National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Valentin Lopez, Chairperson
Amah Mutsun Tribal Band
P.O. Box 5272
Galt, CA 95632

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Chairperson Lopez,

In support of its responsibilities under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the National Aeronautics and Space Administration Ames Research Center (NASA ARC) has initiated Section 106 consultation with the California State Historic Preservation Officer (SHPO) regarding the Hangar 1 Rehabilitation Project (project or undertaking) located at Moffett Field, Santa Clara County, California (see attached Figure 1 for project location map). Built in 1933, Hangar 1 is listed in the National Register of Historic Places (NRHP) as a contributor to the U.S. Naval Air Station (NAS) Sunnyvale Historic District and is also individually eligible for listing; therefore, it qualifies as a historic property for the purposes of Section 106 consultation.

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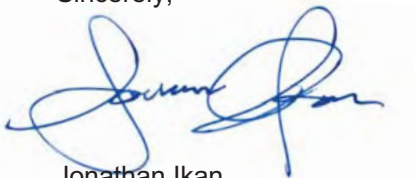
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Please contact me if you have any questions pertaining to this process. I appreciate your attention and look forward to hearing from you regarding this Undertaking.

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Cultural Resource Manager, Facilities Engineering Branch
NASA Ames Research Center, Mail Stop 213-8
Moffett Field, CA 94035
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Cc:

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Andrew Galvan, The Ohlone Indian Tribe

Attachments: Figure 1. Regional Project Location Map

A detailed map of the San Francisco Bay Area and surrounding regions. The map shows major cities including San Francisco, Oakland, Berkeley, San Jose, and San Francisco. A black star icon marks the 'Project Location' near Palo Alto, with a callout box pointing to it. The map includes major highways (Interstates 5, 805, 880, 680, 580, 5, 101, 92, 82, 84, 35, 236, 9, 17, 101, 152) and geographical features like the San Francisco Bay, San Mateo County, and various state parks (Mt. Diablo, Castle Rock, Big Basin, Widder Ranch, Forest of Nisene Marks). The terrain is shown with green and brown shading indicating elevation.

0 5 10 20 Miles
Scale: 1 = 633,600; 1 inch = 10 mile(s)

National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Irenne Zwierlein, Chairperson
Amah Mutsun Tribal Band of Mission San Juan Bautista
789 Canada Road
Woodside, CA 94062

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames
Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Chairperson Zwierlein,

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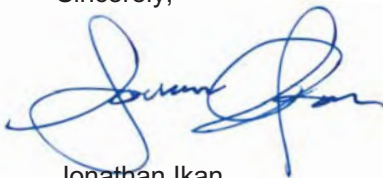
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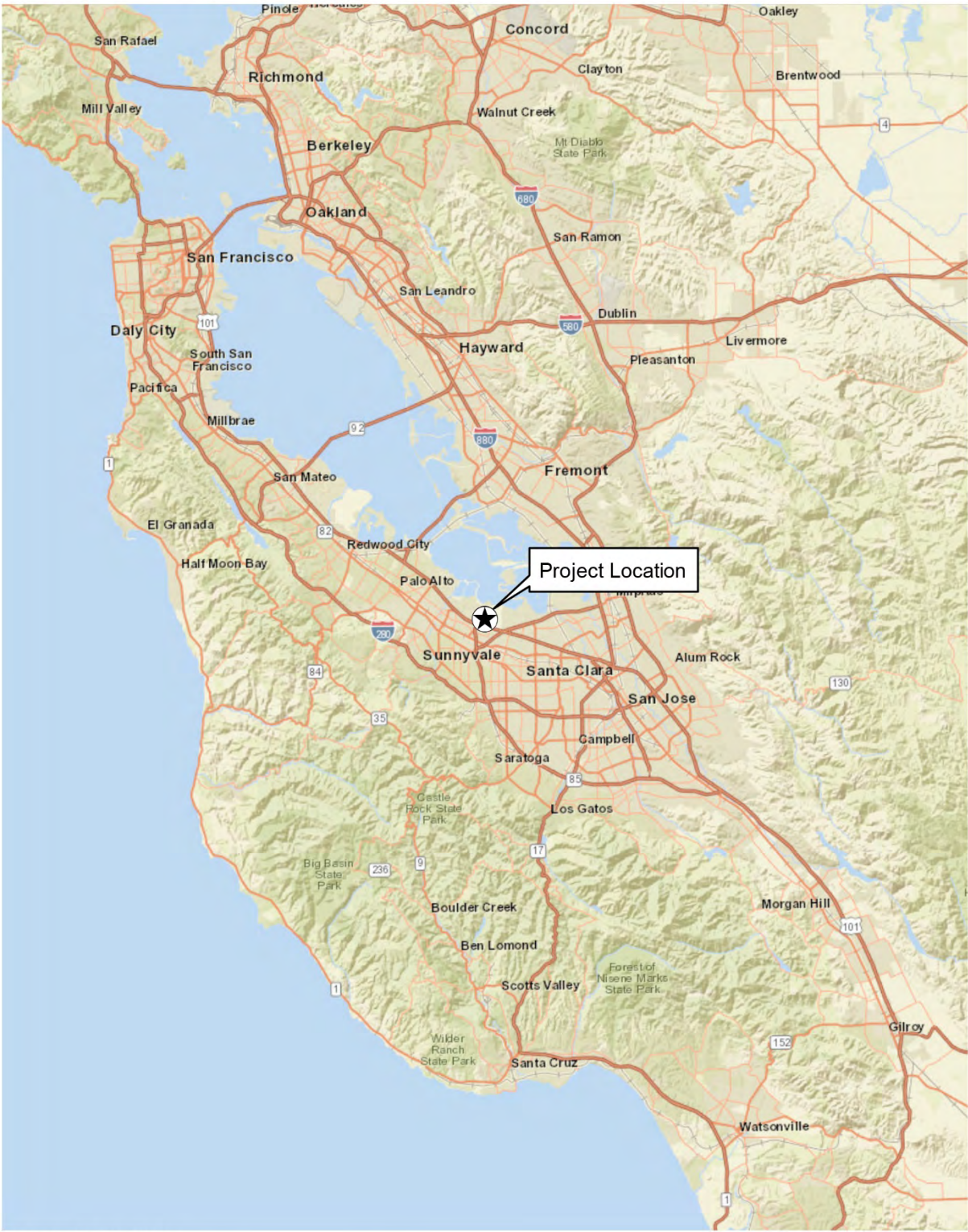
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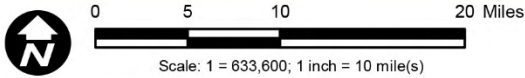
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Attachments: Figure 1. Regional Project Location Map

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Source: ESRI, AECOM, NASA



National Aeronautics and Space Administration



Ames Research Center
Moffett Field, California 94035

February 18, 2020

Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3388
Fremont, CA 94539

Subject: Section 106 Consultation for the MFA Hangar 1 Rehabilitation Project at NASA Ames Research Center, Moffett Field, Santa Clara County, CA (NASA_2019_1210_001)

Dear Mr. Galvan,

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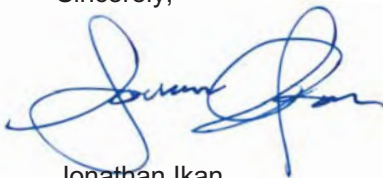
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Attachments: Figure 1. Regional Project Location Map

[illegible]

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Appendix F

Contributors and Non-Contributors

NAS Sunnyvale Historic District

APPENDIX F: CONTRIBUTORS AND NON-CONTRIBUTORS TO THE NAS SUNNYVALE HISTORIC DISTRICT

Building No. and Name	Date	Planetary Ventures' Leasehold	1994 NAS Sunnyvale Historic District (NR listed)	2013 NAS Sunnyvale Expanded District	Historic Property
1 - Hangar #1	1932	YES	Contributor	Contributor	YES
2 - Gymnasium	1933	NO	Contributor	Contributor	YES
3 - Training and Conference Center	1933	NO	Non-contributor	Non-contributor	NO
5 - Water Tower and Storage Tank	1933	NO	Contributor	Contributor	YES
Building #6	1930	NO	Non-contributor	Contributor	YES
10 - Heat Plant	1933	NO	Contributor	Contributor	YES
12 - Commissary/Administration Building	1933	NO	Non-contributor	Non-contributor	NO
13 - Commissary/Storage Building	1933	NO	Non-contributor	Non-contributor	NO
14 - Industry Partners Building	1933	NO	Non-contributor	Non-contributor	NO
15 - Public Works Shop/Security Station	1933	NO	Contributor	Contributor	YES
16 - Public Works Shop	1933	NO	Contributor	Contributor	YES
17 - CPWP Administration Building/Blumberg Administration and Telephone Exchange	1933	NO	Contributor	Contributor	YES
18 - Control Tower/Aerological Building Flight Control Tower	1933	NO	Contributor	Contributor	YES
19 - Bachelor Enlisted Quarters (BEQ)	1933	NO	Contributor	Contributor	YES
20 - Bachelor Officers Quarters (BOQ)	1933	NO	Contributor	Contributor	YES
21 - Garage	1933	NO	Contributor	Contributor	YES
22 - Garage	1933	NO	Contributor	Contributor	YES
23 - Instruction Building	1933; 1936 (enlarged)	NO	Contributor	Contributor	YES
24 - Garage	1933	NO	Contributor	Contributor	YES
25 - Theater	1933	NO	Contributor	Contributor	YES
26 - Gate House/Iron Fence	1933	NO	Contributor	Contributor	YES
29 - NASA Bicycle Distribution Facility	1933	NO	Non-contributor	Non-contributor	NO
32 - Twin Small Tower/Floor Watchtower	1933-1934	YES	Contributor	Contributor	YES
33 - Twin Small Tower/Floor Watchtower	1933-1934	YES	Contributor	Contributor	YES
34 - Shed	1934	NO	Non-contributor	Non-contributor	NO
37 - Scale House	1933	NO	Contributor	Contributor	YES
38 - Tennis Courts	1936	NO	Non-contributor	Non-contributor	NO
40 - Flagpole/Commons	1933	NO	Contributor - Object Only	Contributor - Object Only	YES - Object Only
45 - Assembly Building	1944	NO	Non-contributor	Non-contributor	NO
46 - Hangar #2	1943	YES	Contributor	Contributor	YES
47 - Hangar #3	1943	YES	Contributor	Contributor	YES

Building No. and Name	Date	Planetary Ventures' Leasehold	1994 NAS Sunnyvale Historic District (NR listed)	2013 NAS Sunnyvale Expanded District	Historic Property
55 - Heat Plant for Hangars #2 and #3	1943	YES	Contributor	Contributor	YES
56 - Sanitary Sewer Lift/Pump Station	1943	YES	Outside the historic district boundary	Not evaluated	No
67 - Post Office Building	1940	NO	Non-contributor	Non-contributor	NO
69 - Inert Ammunition Storage	1943	YES	Outside the historic district boundary	Contributor	YES
70 - Fuse & Detonator Magazine	1943	YES	Outside the historic district boundary	Contributor	YES
71 - High Explosive Magazine	1943	YES	Outside the historic district boundary	Contributor	YES
72 - High Explosive Magazine	1943	YES	Outside the historic district boundary	Contributor	YES
73 - High Explosive Magazine	1943	YES	Outside the historic district boundary	Contributor	YES
74 - High Explosive Magazine	1943	YES	Outside the historic district boundary	Contributor	YES
76 - Locksmith Shop	1944	NO	Non-contributor	Non-contributor	NO
81 - Quonset	1944	NO	Non-contributor	Non-contributor	NO
Building #86	1940	NO	Non-contributor	Non-contributor	NO
Building #87	1940	NO	Non-contributor	Non-contributor	NO
105 - Airfield Lighting Vault	1947	NO	Outside the historic district boundary	Contributor	YES
106 - Airfield Compass Calibration Pad (Compass Rose)	1947	YES	Outside the historic district boundary	Contributor	YES
120 - Hazardous Material Storage Compound	1989	YES	Outside the historic district boundary	Non-contributor	NO
126 - Moffett Field Historical Society	1949	NO	Non-contributor	Non-contributor	NO
137 - Aircraft Fuel Storage Tank	1952	YES	Outside the historic district boundary	Non-contributor	NO
138 - Aircraft Fuel Storage Tank	1952	YES	Outside the historic district boundary	Non-contributor	NO
139 - Aircraft Fuel Storage Tank	1952	YES	Outside the historic district boundary	Non-contributor	NO
140 - Aircraft Fuel Storage Tank	1952	YES	Outside the historic district boundary	Non-contributor	NO
141 - Tank Truck Filling Rack	1952	YES	Outside the historic district boundary	Contributor	YES
143 - High Explosive Magazine	1951	YES	Outside the historic district boundary	Contributor	YES
147 - High Explosive Magazine	1951	YES	Outside the historic district boundary	Contributor	YES
158 - Flight Operations Building (Tower)	1954	YES	Outside the historic district boundary	Contributor	YES
169 - Vehicular Bridge	1953	NO	Outside the historic district boundary	Not evaluated	NO
329 - Ultra High Frequency/Very High Frequency (UHF/VHF) Receiver Building	1958	YES	Outside the historic district boundary	Contributor	YES
330 - Open Storage Compound	1958	YES	Outside the historic district boundary	Not evaluated	NO

Building No. and Name	Date	Planetary Ventures' Leasehold	1994 NAS Sunnyvale Historic District (NR listed)	2013 NAS Sunnyvale Expanded District	Historic Property
331 - Airfield Storage	1958	YES	Outside the historic district boundary	Not evaluated	NO
359 - Golf Course Grounds Maintenance Shop	1956	YES	Outside the historic district boundary	Not evaluated	NO
395 - Line Operations Shelter	1948	YES	Outside the historic district boundary	Not evaluated	NO
399 - Storage	1956	YES	Outside the historic district boundary	Not evaluated	NO
400 - Air Operations Storage	1958	YES	Outside the historic district boundary	Not evaluated	NO
409 - Storage	1946	YES	Outside the historic district boundary	Not evaluated	NO
439 - Aircraft Wash Rack	1942	YES	Outside the historic district boundary	Not evaluated	NO
442 - Ordnance Handling Pad	c. 1951	YES	Outside the historic district boundary	Contributor	YES
446 - Communications Tacan Facility	1958; 1986	YES	Outside the historic district boundary	Not evaluated	NO
454 - Transmission Building UHF/VHF	1960	NO	Outside the historic district boundary	Contributor	YES
455 - Storage	1964	YES	Outside the historic district boundary	Not evaluated	NO
471 - Storage	1961	YES	Outside the historic district boundary	Not evaluated	NO
480 - Racquetball Courts	1963	NO	Outside the historic district boundary	Not evaluated	NO
482 - Painting/Washing Facility; Storage Facility (JCM)	1963	NO	Non-contributor	Non-contributor	NO
484 - P-3 Munitions Maintenance Shop; Air/Underwater Shop	1965	YES	Outside the historic district boundary	Not evaluated	NO
485 - P-3 Sentry House; Guard & Watch Towers	1965	YES	Outside the historic district boundary	Not evaluated	NO
486 - P-3 AWW Weapons Magazines/High Explosive Magazines	1965	YES	Outside the historic district boundary	Not evaluated	NO
487 - P-3 AWW Weapons Magazines/High Explosive Magazines	1965	YES	Outside the historic district boundary	Not evaluated	NO
488 - P-3 AWW Weapons Magazines/High Explosive Magazines	1965	YES	Outside the historic district boundary	Not evaluated	NO
489 - P-3 AWW Weapons Magazines/High Explosive Magazines	1965	YES	Outside the historic district boundary	Not evaluated	NO
490 - P-3 AWW Weapons Magazines/High Explosive Magazines	1965	YES	Outside the historic district boundary	Not evaluated	NO
491 - P-3 AWW Weapons Magazines/High Explosive Magazines	1965	YES	Outside the historic district boundary	Not evaluated	NO

Building No. and Name	Date	Planetary Ventures' Leasehold	1994 NAS Sunnyvale Historic District (NR listed)	2013 NAS Sunnyvale Expanded District	Historic Property
492 - P-3 AWW Weapons Magazines/High Explosive Magazines	1965	YES	Outside the historic district boundary	Not evaluated	NO
493 - Swimming Pool at Bldg. 20	1963	NO	Non-contributor	Non-contributor	NO
498 - Storage	1965	YES	Non-contributor	Non-contributor	NO
499 - Storage	1966	YES	Non-contributor	Non-contributor	NO
Building #501	1930	NO	Non-contributor	Non-contributor	NO
502 - Golf Course Restrooms	1967	YES	N/A		
510 - Administrative Building	1967	NO	Non-contributor	Non-contributor	NO
511 - P-3 Missile Integration Facility/Equipment Storage Facility (JP)	1968	YES	Outside the historic district boundary	Not evaluated	NO
527 - Storage	1968	NO	Non-contributor	Non-contributor	NO
528 - High Explosive Magazine	1951	YES	Outside the historic district boundary	Not evaluated	NO
537 - Golf Course Restrooms	1973	YES	Outside the historic district boundary	Non-contributor (Outside period of significance)	NO
542 - Storage	1973	NO	Non-contributor	Non-contributor	NO
545 - Fuel Farm Offices	1973	YES	Outside the historic district boundary	Non-contributor (Outside period of significance)	NO
561 - P-3 Missile Magazine & Torpedo Maintenance/Missile Magazine	1976	YES	Outside the historic district boundary	Non-contributor (Outside period of significance)	NO
566 - Administration Building	1979	NO	Non-contributor	Non-contributor	NO
567 - Warehouse	1978	NO	Non-contributor	Non-contributor	NO
569 - Procurement Office	1978	NO	Non-contributor	Non-contributor	NO
570 - Storage	1978	NO	Non-contributor	Non-contributor	NO
571 - Tennis Courts	1979	NO	Outside the historic district boundary	Not evaluated	NO
580 - Fire Station/Crash & Structural Fire Station	1983	NO	Outside the historic district boundary	Not evaluated	NO
581 - Sign Board/Theater Marquee	1982	NO	Outside the historic district boundary	Not evaluated	NO
591 - 115/12KV Main Electrical Substation	1985	YES	Outside the historic district boundary	Non-contributor (Outside period of significance)	NO
650 - P-3 AIMD Avionics Shop/Administration Building	1975	NO	Outside the historic district boundary	Not evaluated	NO
651 - Battery Locker/Shop	1981 or 1982	NO	Outside the historic district boundary	Not evaluated	NO
653 - P-3 Applied Instruction/Administration Building	1984	NO	Outside the historic district boundary	Not evaluated	NO
654 - P-3 Classroom/Administration Building	1969	NO	Outside the historic district boundary	Not evaluated	NO
655 - P-3 Classroom/Mobility Warehouse A	1945	NO	Outside the historic district boundary	Not evaluated	NO

Building No. and Name	Date	Planetary Ventures' Leasehold	1994 NAS Sunnyvale Historic District (NR listed)	2013 NAS Sunnyvale Expanded District	Historic Property
656 - P-3 Communications & Technical Support Center/129th Rescue Operations	1971	NO	Outside the historic district boundary	Not evaluated	NO
657 - Line Operations/Warehouse F	1955	NO	Outside the historic district boundary	Not evaluated	NO
658 - Line Maintenance Shelter/Warehouse F	1955	NO	Outside the historic district boundary	Not evaluated	NO
659 - Ammunition Service Locker/Warehouse G	1956	NO	Outside the historic district boundary	Not evaluated	NO
660 - Ammunition Service Locker/Warehouse H	1956	NO	Outside the historic district boundary	Not evaluated	NO
661 - Line Operations Shelter/Warehouse I	1955 or 1956	NO	Outside the historic district boundary	Not evaluated	NO
662 - Aircraft Maintenance Hangar	2003	NO	Outside the historic district boundary	Not evaluated	NO
663 - Pararescue Training Facility	2016	NO	Outside the historic district boundary	Not evaluated	NO
669 - P-3 Classroom/Propulsion/Training Facility	1943	NO	Outside the historic district boundary	Not evaluated	NO
679 - Storage/Civil Engineering Warehouse	1992 or 1994	NO	Outside the historic district boundary	Not evaluated	NO
680 - CANG Headquarters	1980	NO	Outside the historic district boundary	Not evaluated	NO
681 - CANG Administrative & Supply/Base Supply Equipment Warehouse	1980	NO	Outside the historic district boundary	Not evaluated	NO
682 - CANG Hazardous/Flammable Material Storage Facility	1980	NO	Outside the historic district boundary	Not evaluated	NO
683 - CANG Civil Engineering	1980	NO	Outside the historic district boundary	Not evaluated	NO
684 - CANG Equipment Storage/Ground Support Maintenance	1984	YES	Outside the historic district boundary	Non-contributor (Outside period of significance)	NO
686 - Parachute & Dinghy Repair/Parachute & Survival Gear Repair Shop	1984 or 1986	YES	Outside the historic district boundary	Non-contributor (Outside period of significance)	NO
780 - Telephone Remote Switch	1989	YES	Non-contributor	Not evaluated	NO
901 - Liquid Oxygen Storage/Cryogenics Facility	1987	YES	Outside the historic district boundary	Non-contributor (Outside period of significance)	NO
934 - Golf Course Club House (19th Hole)	1940	YES	Outside the historic district boundary	Non-contributor	NO
953 - Aircraft Ready Fuel Day Tank and Pumping Station	1956	YES	Outside the historic district boundary	Not evaluated	NO
10A - Chemical Feed & Storage for Bldg. 10 Broiler	1996	NO	Outside the historic district boundary	Not evaluated	NO
478, 482 - Stand-by Generator	1963	NO	Non-contributor	Non-contributor	NO
A - Officers Housing	1933	NO	Contributor	Contributor	YES
A1 - Garage	1933	NO	Contributor	Contributor	YES
B - Officers Housing	1933	NO	Contributor	Contributor	YES

Building No. and Name	Date	Planetary Ventures' Leasehold	1994 NAS Sunnyvale Historic District (NR listed)	2013 NAS Sunnyvale Expanded District	Historic Property
B1 - Garage	1933	NO	Contributor	Contributor	YES
C - Officers Housing	1933	NO	Contributor	Contributor	YES
C1 - Garage	1933	NO	Contributor	Contributor	YES
D - Officers Housing	1933	NO	Contributor	Contributor	YES
D1 - Garage	1933	NO	Contributor	Contributor	YES
E - Officers Housing	1933	NO	Contributor	Contributor	YES
E1 - Garage	1933	NO	Contributor	Contributor	YES
F - Officers Housing	1933	NO	Contributor	Contributor	YES
F1 - Garage	1933	NO	Contributor	Contributor	YES
G - Officers Housing	1933	NO	Contributor	Contributor	YES
G1 - Garage	1933	NO	Contributor	Contributor	YES
H - Officers Housing	1933	NO	Contributor	Contributor	YES
H1 - Garage	1933	NO	Contributor	Contributor	YES
I - Officers Housing	1933	NO	Contributor	Contributor	YES
I1 - Garage	1933	NO	Contributor	Contributor	YES
MF1000 - Runway 32L/14R	1938	YES	Outside the historic district boundary	Contributor	YES
MF1001 - Instrument Runway 32R/14L	1945	YES	Outside the historic district boundary	Contributor	YES
MF1002 - Aircraft Parking Apron	1945	YES	Outside the historic district boundary	Contributor	YES
MF1003 - Hi-Speed Aircraft Fueling Pits	1955	YES	Outside the historic district boundary	Non-contributor	NO
MF1016 - Connecting Taxiways	1945	YES	Outside the historic district boundary	Contributor	YES
MF1016 - East Parallel Aircraft Taxiway	1945	YES	Outside the historic district boundary	Contributor	YES
MF1016 - West Parallel Aircraft Taxiway	1945	YES	Outside the historic district boundary	Contributor	YES
MF1017 - Golf Course	1959	YES	Outside the historic district boundary	Not evaluated	NO
N210 - Flight Sys. Research Lab	1941 or 1947	NO	Outside the historic district boundary	Not evaluated	NO
N211 - Flight Support Facility	1945	NO	Outside the historic district boundary	Not evaluated	NO
N243 - Flight and Guidance Simulation Laboratory	1967	NO	Outside the historic district boundary	Not evaluated	NO
N243A - Flt. & Guidance Simulation Lab	1967	NO	Outside the historic district boundary	Not evaluated	NO
N248 - Aircraft Servicing Fac.	1973	NO	Outside the historic district boundary	Not evaluated	NO
N248A - Grd. Supp. Equip Building	1973	NO	Outside the historic district boundary	Not evaluated	NO
N248B - Grd. Supp. Equip. Bldg No. 2	1976	NO	Outside the historic district boundary	Not evaluated	NO
N248C - Rotorcraft Maintenance Facility	1978	NO	Outside the historic district boundary	Not evaluated	NO
N248D - Aircraft Svc. Storage Bldg	1987	NO	Outside the historic district boundary	Not evaluated	NO
N248E - Aircraft Washrack	1995	NO	Outside the historic district boundary	Not evaluated	NO
N259 - Aircraft Operations Support Facility	1984	NO	Outside the historic district boundary	Not evaluated	NO

Building No. and Name	Date	Planetary Ventures' Leasehold	1994 NAS Sunnyvale Historic District (NR listed)	2013 NAS Sunnyvale Expanded District	Historic Property
Memorial Anchor		NO	Contributor - Object Only	Contributor - Object Only	YES - Object Only

Appendix G

Current Condition Photographs

Appendix G: Current Condition Photographs

Context Views



Contextual overview from Shenandoah Plaza, looking northeast.



Contextual overview of runways with Hangar 1, looking southwest.



Contextual overview of runways with Hangar 1, looking southwest.



View from Hangar 1 with Building 33 and Hangar 2, looking northeast.



View of runways and Building 33 from Hangar 1, looking southeast.



View of Building 32 from Hangar 1 mezzanine, looking northeast.

Hangar 1 Exterior



South and east facades, looking northwest.



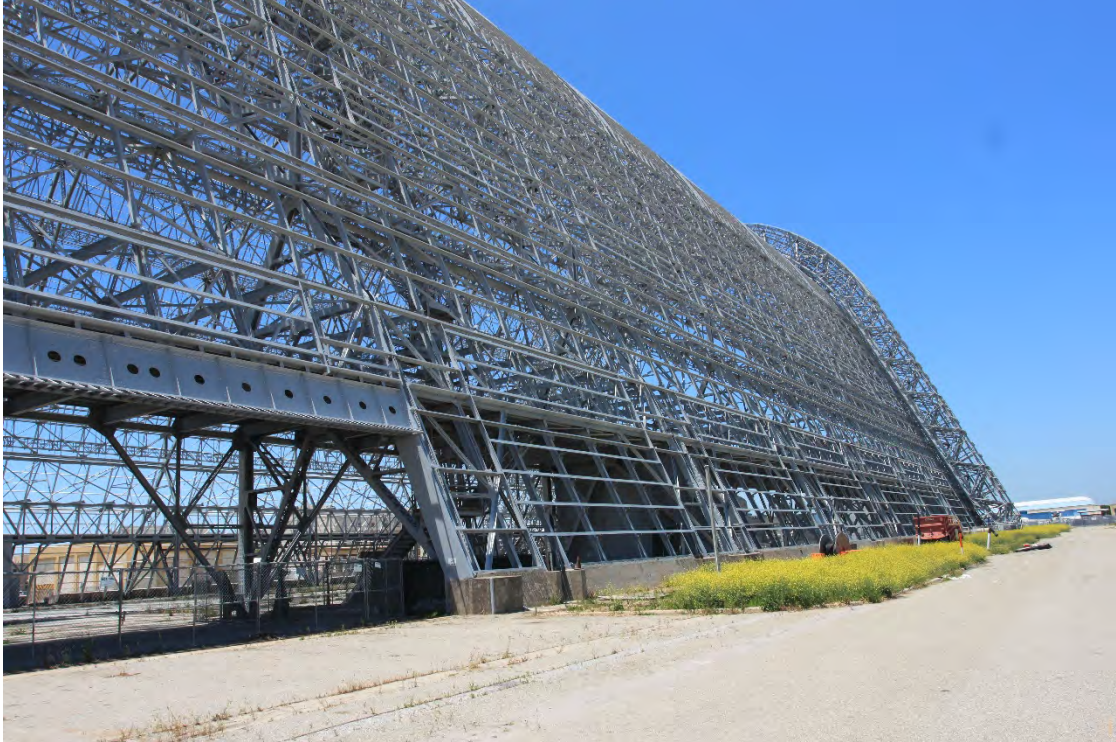
South façade, looking northwest.



East façade, looking southwest.



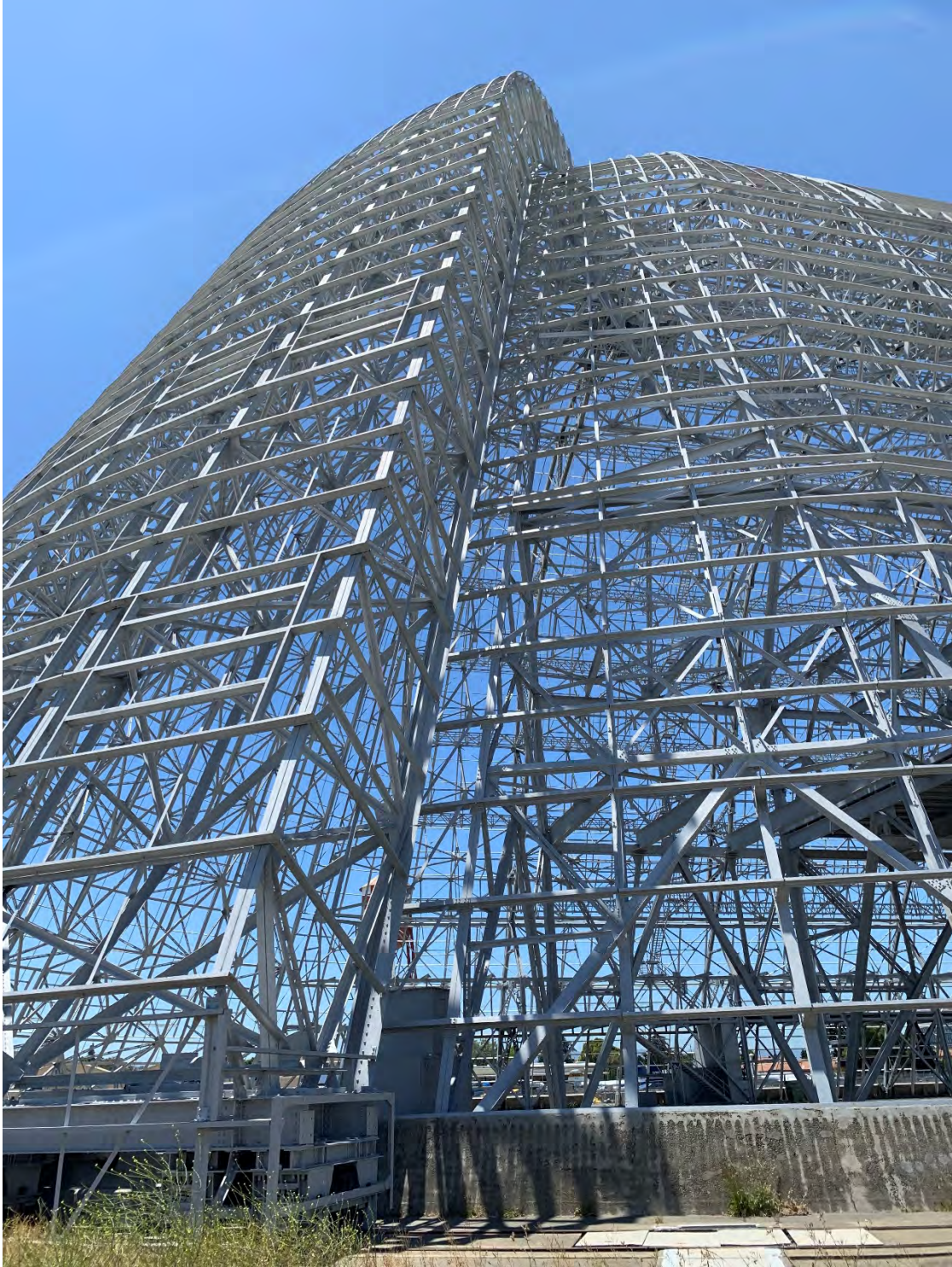
East façade, looking southwest.



East façade with aviation door opening, looking northwest.



Detail of trench drain, looking southwest.



Detail of northwest clamshell door, looking northeast.



Detail of southeast clamshell door tracks, looking southeast.



Detail of nine wheeled truck and steel track at southeast corner for south door, looking southeast.



Detail of concrete stop for southeast clamshell door, looking northwest.



Detail of aircraft door opening on east façade, looking northwest.

Hangar 1 Interior



Interior view of catwalk and steel frame, looking northwest.



Interior view with open clamshell doors, looking northwest.



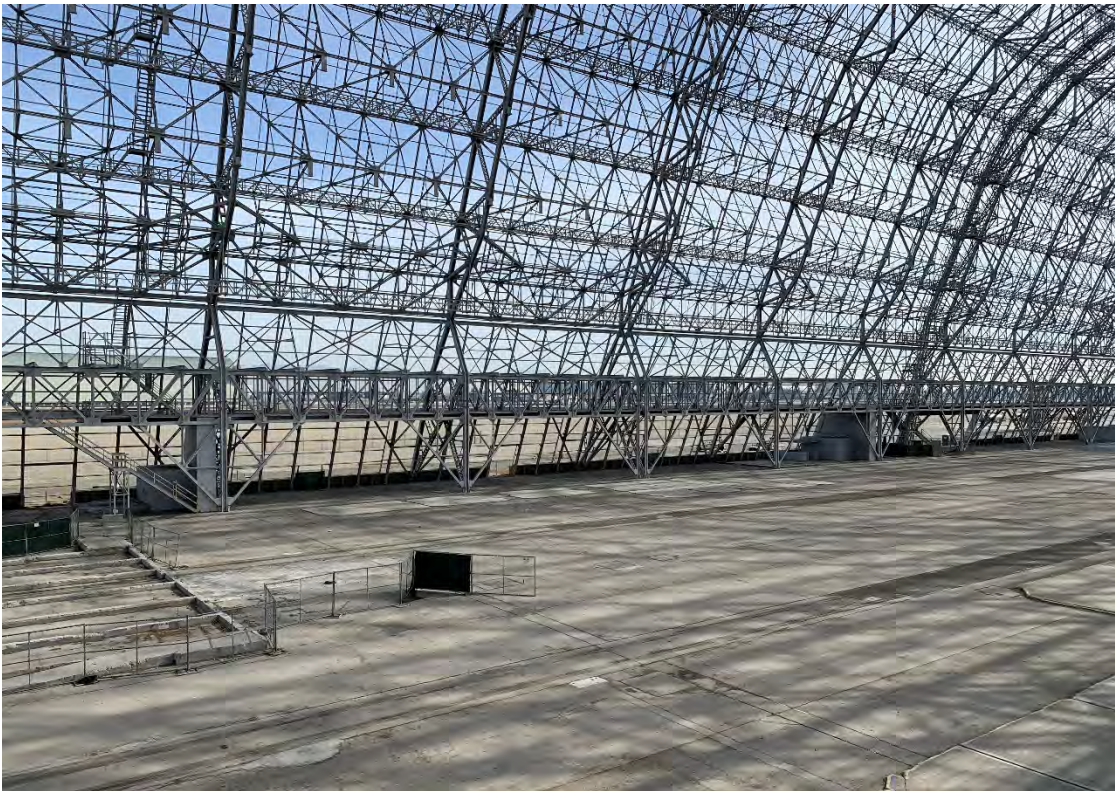
Interior view with closed clamshell doors, looking southeast.



Detail of track switches at northwest clamshell door, looking southeast.



Detail of interior tie-down.



Interior view from west mezzanine, looking southeast.



Interior view from east mezzanine, looking southwest.



Interior, steel A-frame and concrete shell of toilet room, looking northwest.



Interior, detail of stair to mezzanine, looking southeast.



Interior, view of east mezzanine, looking southeast.



Interior, view of east mezzanine, looking northwest.

Appendix H

Select Historic Photographs

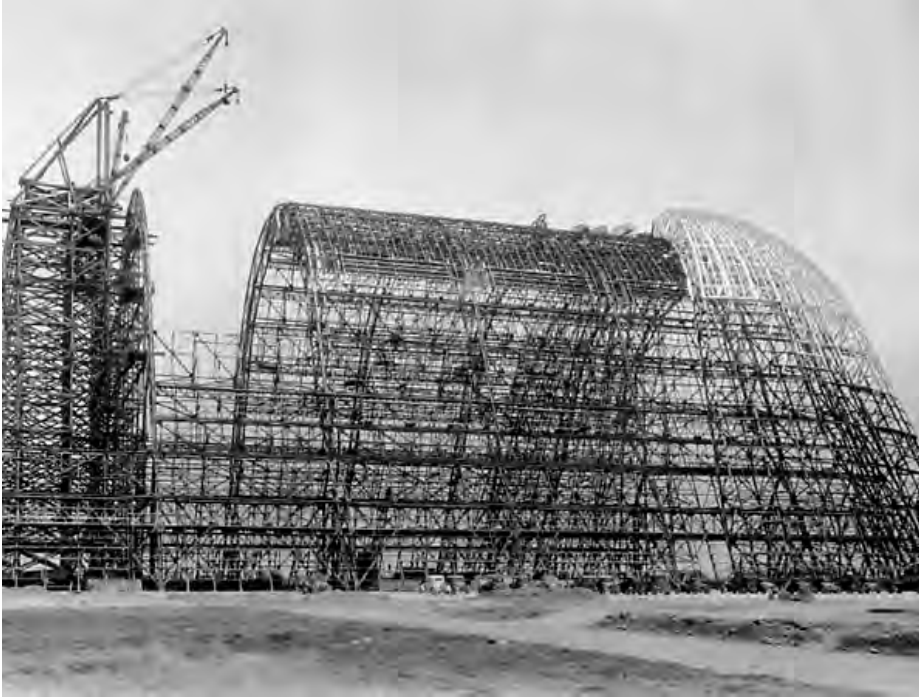
Appendix H: Select Historic Photographs



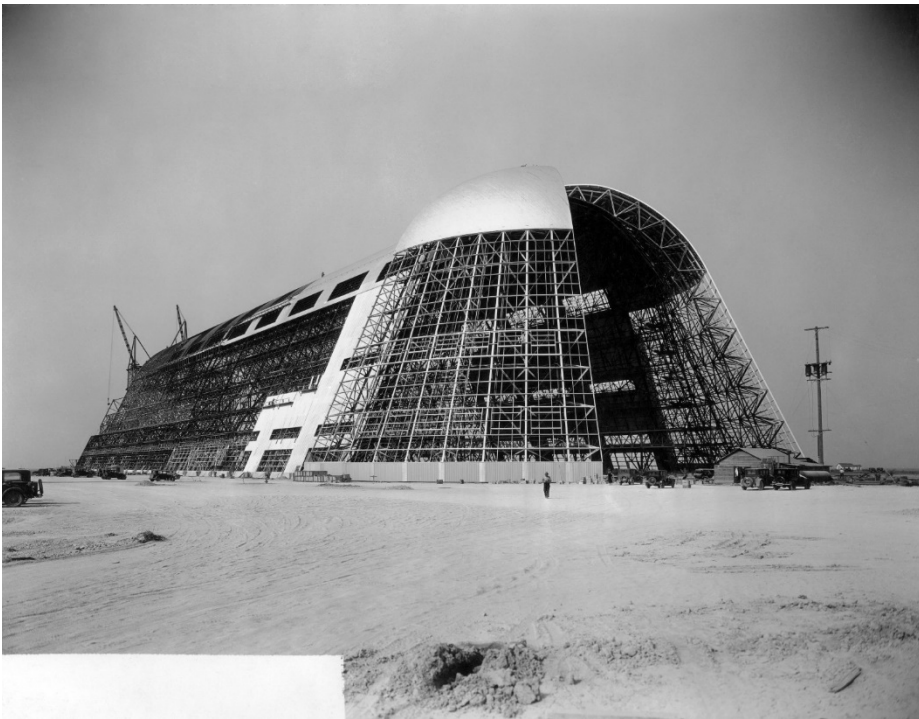
1932, USS *Akron* at Moffett Field and start of Hangar 1 construction, looking northwest.
Source: San Jose Public Library



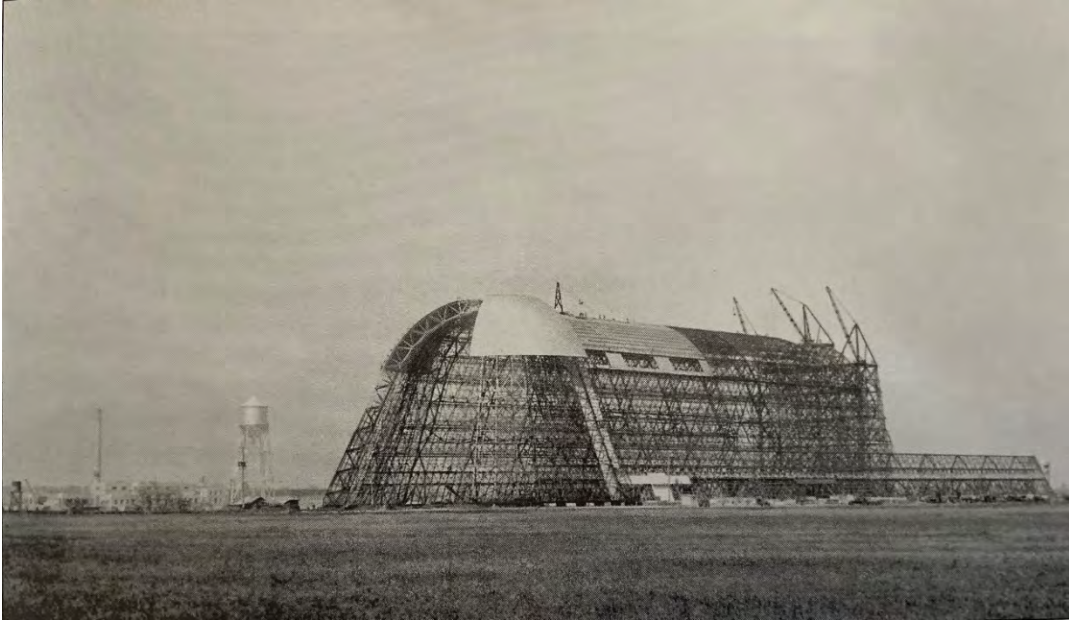
c. 1932, Hangar 1 under construction.
Source: NASA



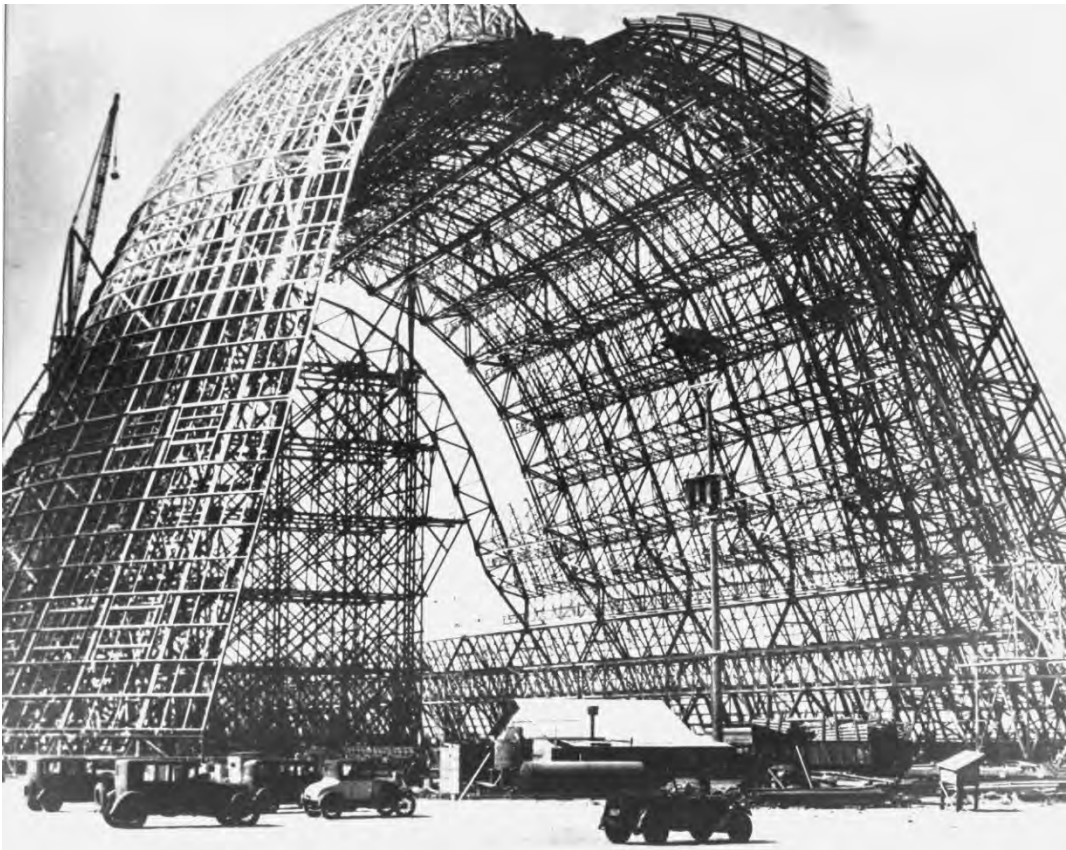
c. 1932, View of the west façade of Hangar 1 under construction, looking northeast.
Source: United States Navy



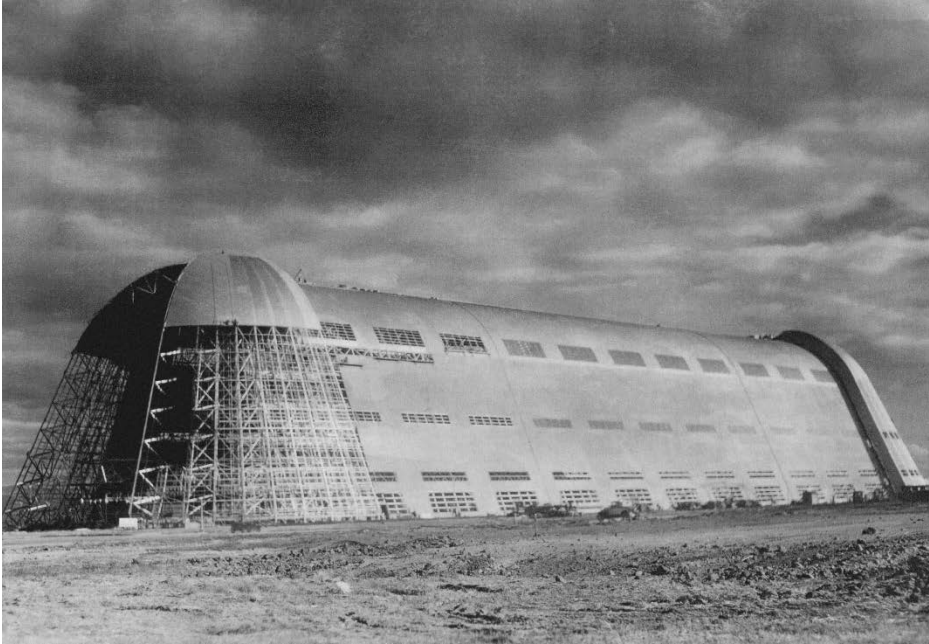
c. 1932, View of west and south façades of Hangar 1 under construction., looking north.
Source: NASA ARC



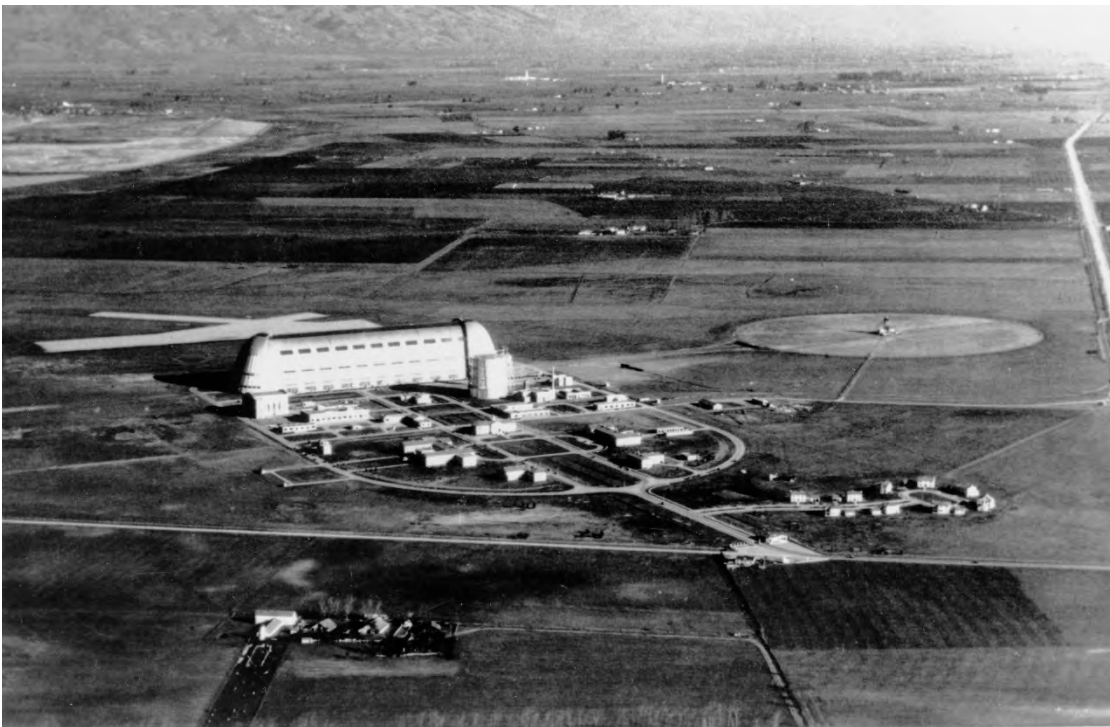
c. 1932, View of the south and east façades of Hangar 1 under construction, looking northwest.
Source: Herman Ewald Finell



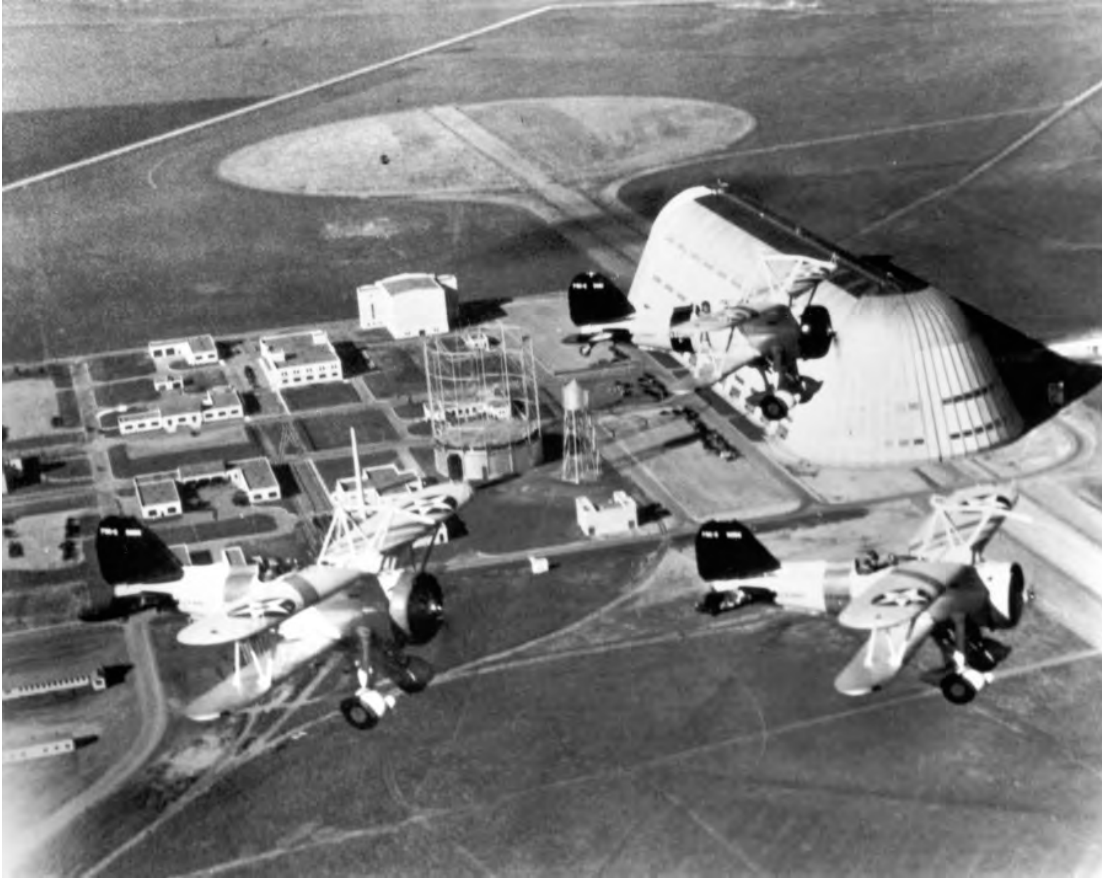
1932, Hangar 1 under construction.
Source: NASA ARC



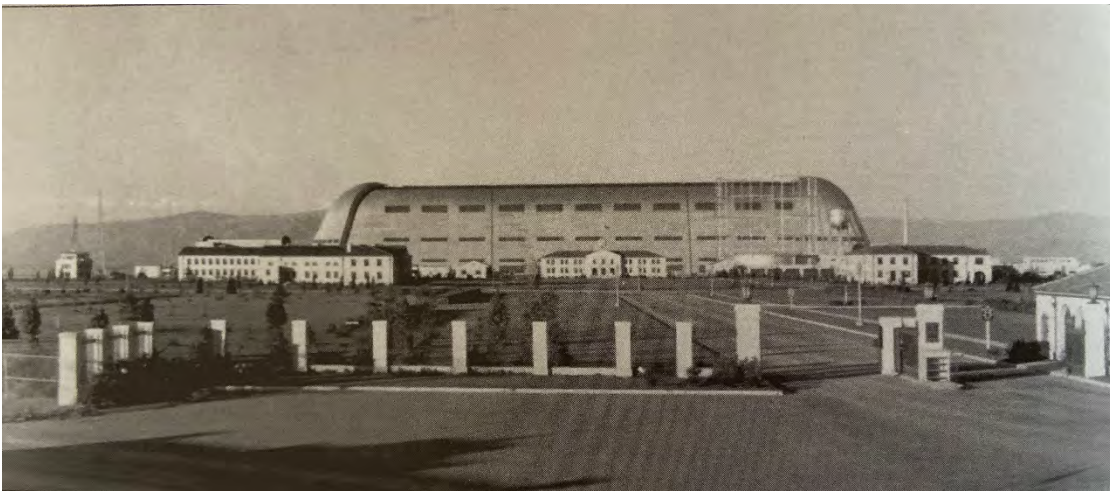
1932, View of the south and east façade of Hangar 1 under construction, looking northwest.
Source: NASA ARC



c. 1933, Aerial view of Hangar 1 and NAS Sunnyvale, looking east.
Source: Moffett Field Historical Society



c. 1933, Aerial view of NAS Sunnyvale with mooring circle, looking northeast.
Source: San Diego Air and Space Museum Archives



c. 1933, NAS Sunnyvale view from front gate looking east, with Shenandoah Plaza in foreground.
Source: United States Navy



c. 1933, NAS Sunnyvale, looking northeast from Shenandoah Plaza.
Source: San Diego Air and Space Museum Archives



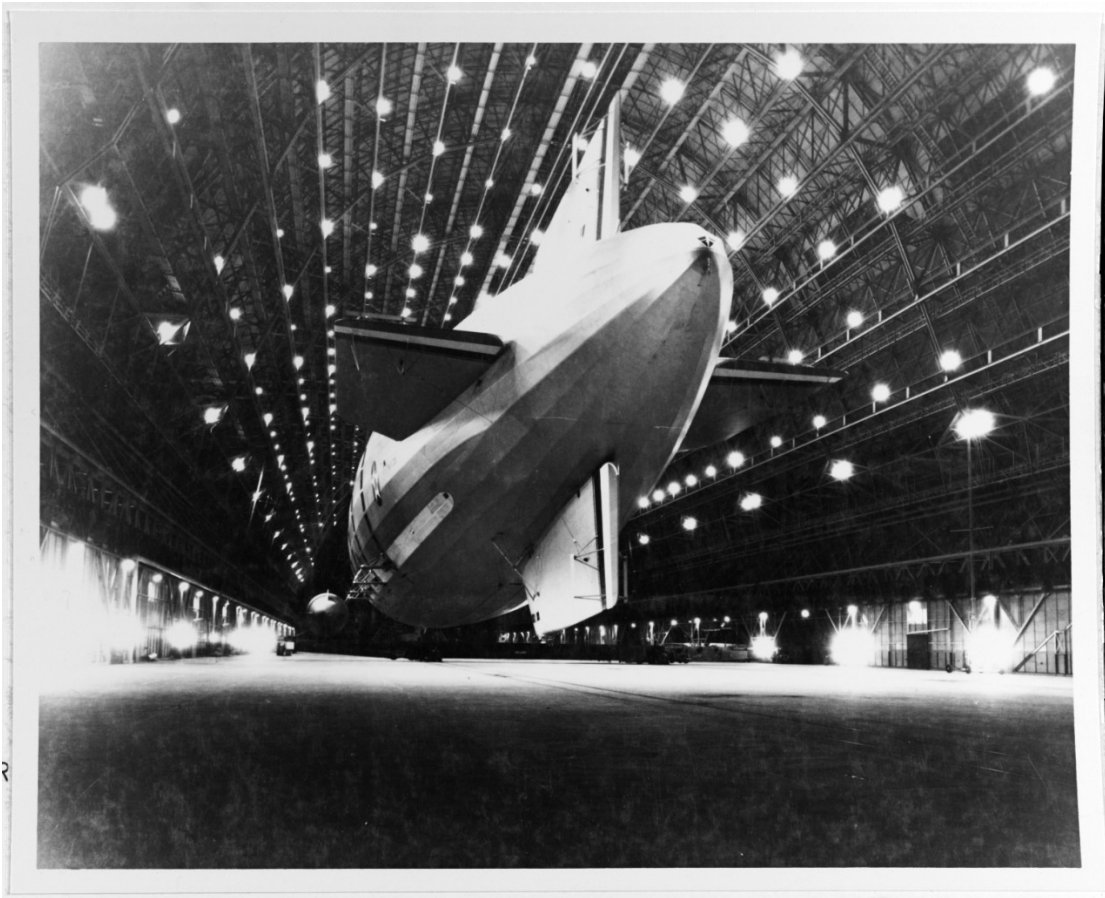
1933, Aerial view of Moffett Field, looking north.
Source: Naval History and Heritage Command



1933, Hangar 1, view of the north clamshell doors, looking southeast.
Source: San Jose Public Library



1933, Hangar 1, view of west façade, looking north.
Source: San Diego Air and Space Museum Archives



1933, USS *Macon* docked in Hangar 1.
Source: Naval History and Heritage Command



1933, USS *Macon* leaves Hangar 1, looking north.
Source: Getty Images



SV-100102 31 October 1933 - Naval Air Station Sunnyvale, California, outside main entrance looking east.

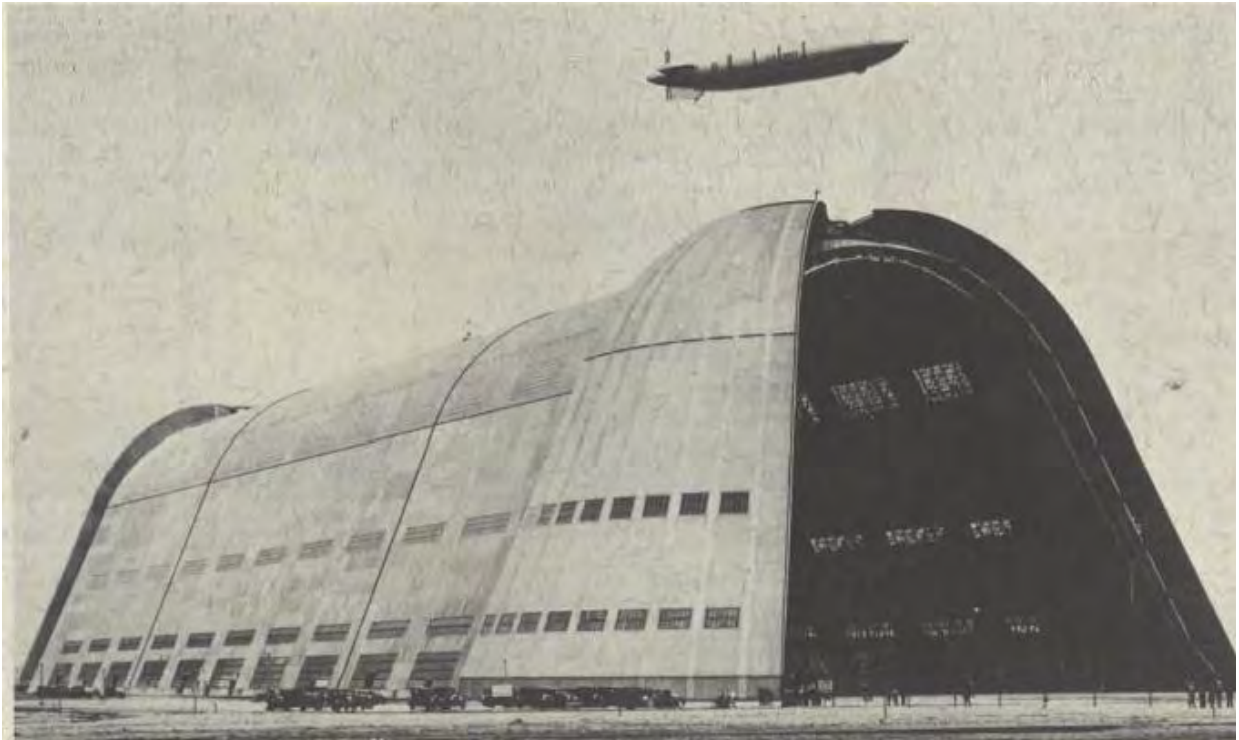
1933, NAS Sunnyvale, looking northeast.
Source: San Diego Air and Space Museum Archives



1933, USS *Macon* flying over Hangar 1, looking northeast.
Source: NASA ARC



1933, USS *Macon* landing at NAS Sunnyvale for the first time.
Source: Naval History and Heritage Command



c. 1934, Hangar 1 with USS *Macon* flying above.
Source: Home Port for Sky Cruisers



c. 1934, Hangar 1 with USS *Macon*, looking northeast.
Source: San Diego Air and Space Museum Archives



c. 1934, NAS Sunnyvale, looking northeast.
Source: United States Navy



1934, Aerial view of NAS Sunnyvale.
Source: United States Navy



1934, USS *Macon* crew inside Hangar 1.
Source: United States Navy



1934, Hangar 1 with U. S. Navy blimp J-4, looking southwest.
Source: NASA ARC



c. 1935, Aerial view of NAS Sunnyvale.
Source: Moffett Field Historical Society



c. 1935, View of Hangar 1, looking northeast.
Source: Getty Images



c. 1935, USS *Macon* parked inside Hangar 1.
Source: Getty Images



c. 1938, Aerial view of NAS Sunnyvale.
Source: NASA ARC



c. 1943, Hangar 1 with Sikorsky flying boat, looking northwest.
Source: NASA ARC



1943, Aerial view of NAS Moffett Field.
Source: NASA Ames History Office



1944, Aerial view of Moffett Airfield prior to completion of Runway 32-R-14L.
Source: Moffett Field Historical Society



1944, Aerial view of NAS Moffett Field.
Source: Moffett Field Historical Society



1944, Aerial view of NAS Moffett Field.
Source: Moffett Field Historical Society



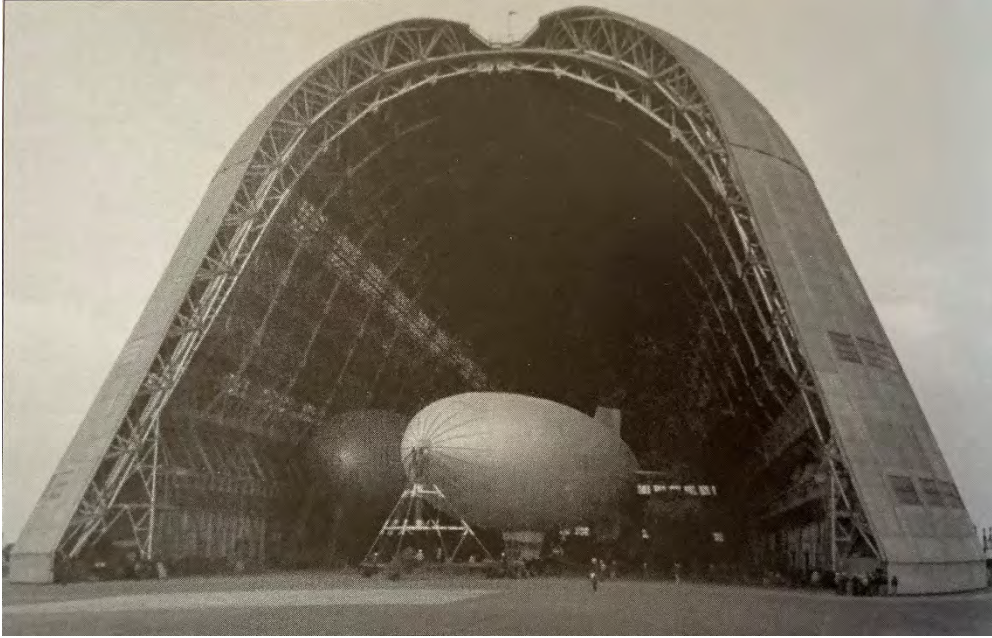
1944, Aerial view of NAS Moffett Field.

Source: NASA ARC



1944, Aerial view of NAS Moffett Field.

Source: Naval History & Heritage Command



1944, K-ship entering Hangar 1 on portable mast.
Source: NASA ARC



c. 1945, Aerial view of NAS Moffett Field.
Source: NASA ARC



c. 1945, Aerial view of NAS Moffett Field.
Source: NASA Ames History Office



c. 1945, Navy blimps make way for transports inside Hangar 1.
Source: Moffett Field (Lighter Than Air)



1946, Aerial view of NAS Moffett Field.
Source: NASA ARC



1947, Aerial view of NAS Moffett Field during Naval Air Transport Service.
Source: Moffett Field Historical Society



1959, Aerial view of Moffett Airfield.
Source: Seabee Archive



c. 1961, Hangar 1 at Moffett Field, looking northwest.
Source: MilitaryMuseum.org



c. 1964, Aerial view of Moffett Airfield and golf course.
Source: California History Center



1968, Aerial view of Moffett Airfield. Note black bitumen coating on the roof of Hangar 1.
Source: Moffett Field Historical Society



1992, Hangar 1 from Shenandoah Plaza, looking northeast.
Source: Historic American Engineering Record #CA-335



1992, View of Hangar 1 south doors, looking north.
Source: Historic American Engineering Record #CA-335



1992, View of Building 33 with Hangar 1 in the background, looking northwest.
Source: Historic American Engineering Record #CA-335



1992, Building 32 with Hangar 1 in the background, looking northwest.
Source: Historic American Engineering Record #CA-335



1992, East façade of Hangar 1 with Building 32 in the background, looking south.
Source: Historic American Engineering Record #CA-335



1992, Detail of aviation door on east façade, looking northwest.
Source: Historic American Engineering Record #CA-335



1992, West façade, looking southeast.
Source: Historic American Engineering Record #CA-335



1992, Detail of door and window on west façade, looking east.
Source: Historic American Engineering Record #CA-335



1992, West façade with south door tracks and concrete stop in foreground, looking north.
Source: Historic American Engineering Record #CA-335



1992, East façade, looking south.

Source: Historic American Engineering Record #CA-335



1992, Interior of Hangar 1, looking south.
Source: Historic American Engineering Record #CA-335



1992, Interior of Hangar 1, looking north.
Source: Historic American Engineering Record #CA-335



1992, Interior of Hangar 1 south doors, looking south.
Source: Historic American Engineering Record #CA-335



1992, Interior of Hangar 1, looking northeast.
Source: Historic American Engineering Record #CA-335



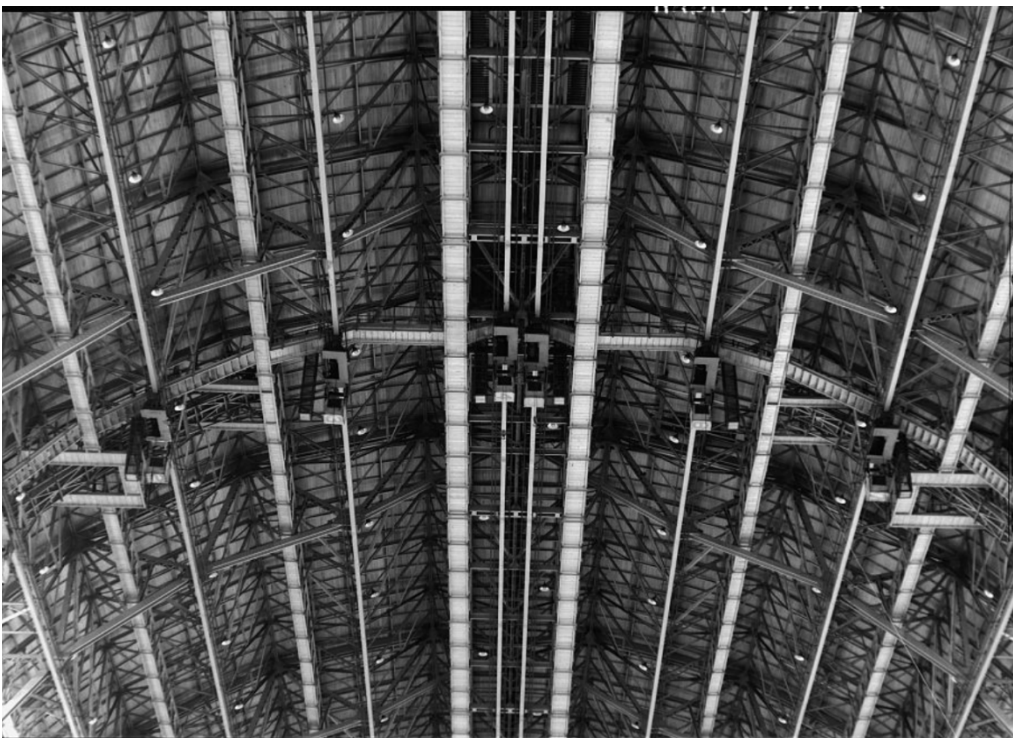
1992, Detail of south door framing.
Source: Historic American Engineering Record #CA-335



1992, Detail of south door framing and tracks, looking southeast.
Source: Historic American Engineering Record #CA-335



1992, Detail of office and shop structure along west wall, looking northwest.
Source: Historic American Engineering Record #CA-335



1992, Detail of roof framing with catwalks, elevators and cranes.
Source: Historic American Engineering Record #CA-335



1994, Blimp symbolically lifting off from Moffett Field after disestablishment ceremony.
Source: Wayne McPherson Gomes



1994, Hangar 1 during disestablishment ceremony.
Source: Wayne McPherson Gomes



1999, View of the north and east façades of Hangar 1, looking south.
Source: NASA ARC



2012, View of the east façade of Hangar 1 with exposed frame and partial skin, looking northwest.
Source: NASA ARC